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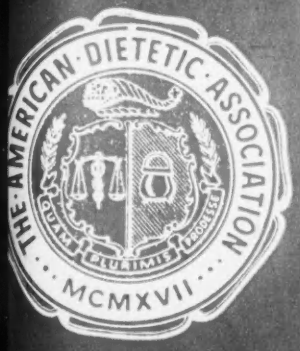

38th A.D.A.
Annual Meeting
St. Louis
October 18-21, 1955

Advances in Nutrition Research — *Charles Glen King*

An Experimentalist's Approach to Obesity — *Jean Mayer*

World Wide Opportunities — *D. Mark Hegsted*

Preserving Foods by Radiation — *Samuel A. Goldblith*

Nutritive Values and Flavor in Frozen Meat — *Lendal H. Kotschevar*

Food-Borne Diseases — *Dorothy L. Hussemann*

Nutrients in Meals and Snacks of Children — *Ercel S. Eppright and Pearl P. Swanson*

A Visit with Miss Barbara Lacy — *Yasuko Yoshida*

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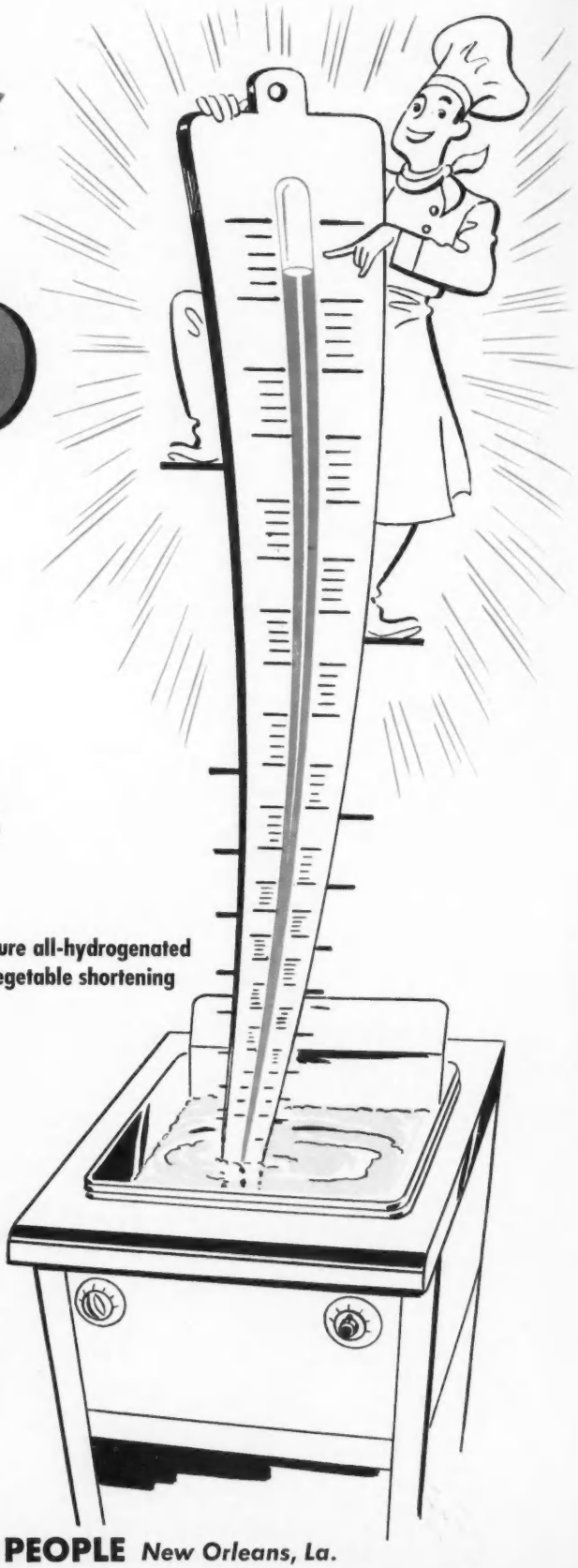

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Advances in Nutrition Research[1]

CHARLES GLEN KING, Ph.D., Sc.D.

Scientific Director, The Nutrition Foundation, New York City

HIGH spots in nutritional research are not easy to identify. Some reports stand out like beacon lights, but others may first appear like routine windows on the side of the building, then later when the sun comes to a different position they suddenly flash with spectacular effect. So, forgive me, if I seem guilty of gross omissions at some points and over-imagination at others.

In discussions of current research, one also faces another problem that bears an analogy to bright windows: a later paper may have the effect of throwing a brick through a window that looked very bright at first.

Two areas of nutrition research seem to me to stand out for special emphasis. First, is the growing importance of mineral elements in regard to basic physiology at all levels, from plants to the human problems of health.

Second, is the growing evidence that we must increasingly regard nutrients in terms of the *total organism* and the interplay or balance of all of the nutrients in the preservation of health on a life-span basis.

These two trends may not seem new or revolutionary, but I think they merit emphasis, both with respect to current research and in their implications for education and practice. Vitamins, for example, are no less important than they were one or two decades ago when their discovery was so exciting, but you will note that most of the current work relating to vitamins deals with their interplay with other nutrients and the long-term relationships of these balances to protecting health. Single or acute deficiencies become less and less important.

MINERAL ELEMENTS

Vanadium

This year, *vanadium* was introduced into the trace element group as being definitely essential—at least for plant growth (1). There is still no direct evidence that it is essential as a nutrient for mammals, but I think the situation is at least exciting. Geyer, for example, has reported (2) that vanadium can play an important role in increasing the resistance of experimental animals to dental caries. Syrian hamsters were used in these initial tests, so there will be considerable interest in finding how general this relationship is. Meanwhile, substantial interest attaches to this preliminary report, because most of the groups doing extensive research on relationships between nutrition and dental caries—for example, Sognnaes and Shaw at Harvard University (3) and the group with Elvehjem at the University of Wisconsin (4)—have observed also that minute amounts of one or more unidentified mineral elements play an important role in the prevention of dental caries. Harris at the Massachusetts Institute of Technology has reported preliminary work of the same nature, and a large number of clinical observations point in the same direction. These studies do not minimize the importance of *fluorides* in any sense—rather they supplement the work dealing with all nutrients that are essential to maximum protection against dental caries.

For interesting reading, in addition to the information about dental caries, I would recommend that you read the paper by Sognnaes (5), giving an account of the tiny colony on Tristan da Cunha, an island in the South Atlantic, between Brazil and Africa. The diet of the inhabitants is chiefly potatoes and fish, but their teeth are remarkably free from decay. In the nine- to twelve-year-old age group, for example, 100 per cent were free from dental caries, and more than one-third of the population remained caries-free up to the age of fifty.

Meanwhile, the extension of fluoridation of public water supplies to lessen the incidence of dental caries in American, Canadian, and European communities has progressed at a rapid pace. This has occurred despite a considerable amount of organized opposition by individuals who could scarcely be classified as authorities in that field of research and practice.

Molybdenum

Next to vanadium, perhaps we should record *molybdenum* as one of the newer metallic elements to

[1] Presented at the 37th Annual Meeting of The American Dietetic Association in Philadelphia, on October 29, 1954.

reach prominent consideration in animal nutrition. The Johns Hopkins group (6, 7) has shown that molybdenum functions in the enzyme system which controls the reduction of nitrates for plant utilization. Apparently it functions also in nitrogen fixation. Identification of molybdenum as an essential part of the enzyme, xanthine oxidase, has been confirmed and extended in many laboratories. In addition, the Wisconsin workers (8) have shown that this element functions as a constituent of aldehyde oxidase and as a carrier to the cytochrome system. Hence, it appears to be one of the major elements in controlling cellular respiration.

Investigations with animals at the University of Florida (9) continue to demonstrate the importance of the interplay or *balance* between molybdenum, copper, iron, phosphorus, and cobalt (via vitamin B_{12}) in maintaining a favorable balance in animal nutrition.

To give further emphasis to the importance of interplay among different types of nutrients, one should also point out that the Wisconsin group (10) has shown repeatedly how important the intake of adequate protein can be for the proper utilization of molybdenum in forming the liver enzyme, xanthine oxidase.

Zinc and Copper

Lest you think I have too little regard for immediate problems in human nutrition, with reference to the trace mineral elements, I should like to point out that Vallee at Harvard University and Neurath at the University of Washington have just reported that the protein-digesting enzyme, pancreatic carboxypeptidase, contains *zinc* as an essential element (11). This trace mineral element now has at least two essential functions to its credit.

Mahler and his associates at Wisconsin have also discovered a new role for *copper*, that of controlling the oxidation of fatty acids (fatty acid coenzyme A dehydrogenase). Here it is teamed up with iron and riboflavin to function with the vitamin, pantothenic acid, at one end of the reaction chain, and with the cytochrome system at the other, where oxygen enters the cycle (12, 13).

Magnesium

The importance of *magnesium* was highlighted by several advances during the year. The interplay with calcium, phosphorus, and potassium is especially significant. Among these findings one should note the report by Grollman (14) indicating an active interplay between magnesium and the hormone, cortisone, as they jointly affect serum and phosphate.

Of further interest in this area is the report of Constant and Phillips at the University of Wisconsin in their studies with cotton rats (15). A diet characterized by a high intake of calcium and a low intake of magnesium introduced a number of imbalances, among which the most striking was the tendency for widespread deposition of calcium in soft tissues. The deposits were conspicuous in the heart and abdominal muscles. A change in phosphate excretion followed immediately after a change in magnesium intake and, within two weeks, there was a marked effect upon creatinine excretion. Magnesium ion has an important role, of course, as a coenzyme in protein synthesis.

PROTEIN NUTRITION

In the field of protein nutrition, Rose and his associates (16) have reported a full summary of their observations on the effect of the whole protein intake, in contrast with the ingestion of crude hydrolysates or pure amino acids, in sparing the demand for extra calories. These studies on human subjects demonstrated that when the body's requirement for essential amino acids was met by feeding casein as a whole protein, the caloric requirement to maintain nitrogen balance was regularly in the range of 35 calories per kilogram of body weight. But, when nitrogen balance was maintained by feeding either an equivalent of hydrolyzed casein or an adequate amount of the essential amino acids, 45 calories instead of the normal 35 were now required per kilogram of body weight.

This report gives added significance to other investigations demonstrating the importance of good quality, whole protein foods which supply optimum balances of the amino acids in contrast to foods which provide amino acids that are not in approximately ideal ratios to one another and in the form of whole proteins.

For example, the Wisconsin group has reported a number of relationships between amino acid balances and the deposition of excessive fat in the liver of experimental animals. Their recent reports indicate that when the protein intake is in the marginal range of 9 per cent or less, even with such good proteins as furnished by casein, beef, pork or egg albumen, it is easy to induce excessive fat deposition in the liver by moderate additions of specific amino acids. The amino acids studied most prominently in the work were threonine, lysine, histidine, and glycine. These results were of special interest because adequate quantities of methionine and choline were furnished in the basal diet (17, 18).

When one observes the effects on experimental animals such as reported by Elvehjem, Rose, Stare, and Best, one can hardly escape being surprised that injuries to human health are not more clearly associated with protein intakes of poor quality. Perhaps the most widespread disease associated with inadequate protein intake is kwashiorkor. In most of the dietary patterns where kwashiorkor is endemic, however, the intake of animal protein foods is extremely low. The diets are also unbalanced in minerals and vitamins. This situation presents one

of the most interesting and challenging world nutritional problems. One should note, also, that there is a considerable amount of evidence that these problems of optimum protein balance are among our own major problems in the United States and Canada, even if the evidence is not so clear.

VEGETARIANS

Among the moderately surprising reports during the year, dealing with over-all dietary practices, was that of Hardinge and Stare (19) which included physical and laboratory findings but was relatively favorable in its appraisal of vegetarian diets. Of course, when vegetarians are in the "moderate" group and regularly consume milk, eggs, and a few products of that kind, it is not difficult to see how they could achieve a good over-all diet; most of them are relatively "diet conscious" in their eating practices. The record for those designated as "pure vegetarians" is more difficult to interpret.

MATERNAL AND INFANT NUTRITION

Another paper of a relatively broad nature that merits careful study is the report on the Vanderbilt Cooperative Study on Maternal and Infant Nutrition (20). I would like to call your attention to two aspects of this report:

(a) The record of dietary practices did not reveal as many instances of extremely poor diets among the low-income groups as one might expect, or perhaps as one would have found a few years earlier.

(b) Differences in health records among those whose diets were of low or intermediate quality were not as great as one would expect in comparing this study with records from other areas.

I think there is a great need for comparative studies of this nature by different clinical investigators, in which there is an effort to be completely objective in appraising the effect of generous or intermediate concepts of good nutrition.

In terms of infant nutrition, the reports by György and his co-workers (21) have been interesting with respect to the effect of nutrients in mothers' milk in establishing a favorable bacterial flora in the intestinal tract. The trend of this evidence substantiates the observation of many students of infant nutrition in regard to the value of breast feeding. The role of intestinal flora in infant feeding is probably more important and more complex than has been generally recognized.

INTRINSIC FACTOR

Perhaps many of you heard or read the report by Schilling (22) at the Federated Societies meeting last spring, on the effect of intrinsic factor on the absorption of orally administered vitamin B_{12}. There have been many excellent reports in this field, but I would like to quote a small section from this paper:

"Several recent observations have demonstrated conclusively that intrinsic factor enhances the absorption of orally-administered vitamin B_{12}. The mechanism through which intrinsic factor increases intestinal absorption of vitamin B_{12} has not been elucidated. In man, the mucoprotein, intrinsic factor, is secreted only by the gastric mucosa.

"For the present, intrinsic factor may be considered to exert a unique type of biological activity, for no other substances are known to be secreted exclusively for the enhancement of absorption of a specific vitamin from the normal diet. That there may be 'intrinsic factors' for other essential nutrients is an intriguing consideration."

PANTOTHENIC ACID

Among other vitamin studies, the reports on pantothenic acid have been highly significant. The role of this vitamin in forming coenzyme A and then forming a series of catalysts that control a large segment of all of the metabolic processes dealing with fats is undoubtedly of first rate importance. Thus far, however, there is little information dealing with its relationship to human health. Hence, each lead in this direction merits close attention.

Bean and Hodges at the University of Iowa (23) have shown that human volunteers with deficiencies of pantothenic acid soon reflect distortions in the functioning of the adrenal cortex and in the peripheral nervous system. They have also observed that restoration of these functions after they had been impaired was accomplished only partially by administering large quantities of the vitamin alone. But when depleted patients were given a good diet of common protective foods in generous quantities (containing all of the nutrients), recovery was relatively rapid and complete.

Dinning *et al.* at the University of Arkansas (24) have also demonstrated with experimental animals a close relationship between the intake of pantothenic acid and the requirement for the amino acid, methionine. This report furnishes another illustration of the quantitative interplay between amino acid intake and vitamin intake.

Zucker and Zucker at Columbia University (25) furnished additional evidence of the importance of pantothenic acid deficiency as a causative factor in lowering the resistance to bacterial infection in experimental animals. Reid at the National Institutes of Health (26) extended the pantothenic acid quantitative studies to include the guinea pig as an experimental animal. This report is mentioned in part to bring attention to the importance of Dr. Reid's work in developing a purified diet for guinea pigs that increases their usefulness in a great many areas of nutrition.

A novel kind of nutrition research was of interest during the year in identifying a toxic principle that occurs in various legumes. Dasler reported (27) the successful isolation and identification of a toxic prin-

ciple from sweet peas. The product proved to be a peptide whose administration even in relatively small quantities induces the disease known as *lathyrism*. Human injuries from this cause apparently are not uncommon during times of severe food deprivation.

FATS

With reference to fat metabolism, mention should be made of the paper by Wiese and co-workers from the University of Texas (28) dealing with the requirement for essential fatty acids in infants and children. We have had relatively little metabolic and analytic work of this nature in comparison with the apparent importance of fats and oils in human dietaries. One reason for the slowness in developing human nutrition studies of this nature has been the lack of analytical methods for measuring the small amounts of unsaturated fatty acids that are readily available for studies of blood and biopsy samples of human tissues. The report included a conclusion that when linoleic acid is supplied in the human dietary, arachidonic and other more highly unsaturated acids are apparently not necessary.

Another paper of broad interest was that of Blecher and Gurin at the University of Pennsylvania which demonstrated the broad role of acetate groups in the metabolism of fatty acids and cholesterol (29). The four-carbon fragment, acetoacetate, apparently could not be converted directly into cholesterol, except after passing through the two-carbon or acetate stage. The precision with which studies of this kind can now be conducted with minute amounts of tissue and radiocarbon-labeled metabolites is illustrative of a new day in nutrition research.

CHRONIC VS. ACUTE IMBALANCES

An investigation that merits close attention among nutrition scientists and practitioners is the report from the University of Toronto this year summarizing their extensive observations on the relationships between diet and the degenerative diseases associated with atherosclerosis (30). Although their techniques and controlled experiments have been based primarily on studies with rats, the Toronto team also include work by clinical pathologists. A point of special interest is their conclusion that repeated moderate injuries having a nutritional origin ultimately have a pathologic effect on the liver, kidneys, arteries, and heart that is analogous to the effects of acute deficiencies and imbalances. This concept, if it is applicable in human nutrition, is important in support of a strong educational program to maintain high quality and well balanced diets throughout the life span, beginning with gestation and continuing through infancy and the intermediate ages when our population tends to be less nutrition conscious.

CONCLUSION

The impact of finding that degenerative changes in the human body result in much poor health among the older members of our population is evident to nearly all students of nutrition and public health. Relationships to excessive body weight are perhaps most evident, but there are many gaps in our understanding of the causative background of degenerative diseases.

Most investigators who have worked with experimental animals and most statisticians who have studied the respective records in human health are convinced of the great importance of good nutritional practices throughout the life span. On the other hand, from an educational viewpoint and from that of working in cordial relation with the medical profession, we need to be always on guard to make a conservative appraisal of the data on which we base our educational and practical measures.

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Weight Control Is No Panacea for All Health Problems

Speaking before the Weight Control Colloquium held at Iowa State College, January 18 through 20, Dr. Ancel Keys, University of Minnesota, cautioned that correction of overweight among people in the U. S. cannot be expected to produce a *major* change in the national health picture. He pointed out that current campaigns for weight control are based primarily on the health hazard of overweight as indicated by life insurance company statistics, which may be derived from atypical samples of the population.

"These statistics are impressive," Dr. Keys said, "but not fully satisfactory when analyzed critically together with other relevant data. One major fault is that they deal with general averages, but weight control is an individual problem, and the evidence does not prove that all overweight persons ought to reduce for health's sake." Obesity is undesirable for reasons of esthetics, personal comfort, and economy, and must be considered a potential health hazard when it is marked, but obesity and overweight are not necessarily identical and need not even be closely related.

"Even if insurance company experience gives an accurate picture of the whole population, it is easy to show that the current excessively high mortality of American men in middle age cannot be ascribed wholly or even in large part to an excessive incidence of overweight *per se*."

Dr. Keys cited studies showing that "normal women are much fatter than normal men. Both men and women of our urban population tend to grow progessively fatter from the twenties at least into the fifties. In men, at least, this change tends to be accompanied by an absolute decrease of muscle. The commonly observed increase in weight with age is actually an underestimate of increasing fatness.

"Obesity is better estimated by experienced observation or with skinfold calipers than with weight scales," Dr. Keys declared. "And, the health-promoting tendency of a diet is often better estimated from knowledge of its composition than from its effects on weight.

"Fortunately, careful restriction of fat consumption may do two jobs for the fat person. It will tend to reduce caloric intake, and so result in the loss of body fat. But perhaps more important for the middle-aged adult, it will tend to reduce the concentration of cholesterol and cholesterol-bearing lipoproteins in the blood. And this last may have an important effect in preventing or inhibiting the deposition of cholesterol in the arteries, which is really our number one health problem."

An Experimentalist's Approach to the Problem of Obesity[1]

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THERE is no doubt that our thinking on the problem of obesity is progressing. Until a few years ago, meetings devoted to the problem of obesity might have been centered around the secondary effects of the condition; or about treatment; or even about educational methods of empirical prevention. But it would have been held unnecessary, if not outright dangerous to discuss the origin and mechanism of development of obesity. Most nutritionists and physicians simply held with Newburgh (1) that obesity was fully explained by habitual overeating.

Any possible search for deeper causes was frowned on, if not discouraged, in that it might tend to allow patients to diminish the blame with which they were stigmatized if it was once conceded that genetic factors, or hormonal imbalance, or an inactive mode of life forced by circumstances could be made to share the blame with gluttony. The old view of medicine, still to be found in many primitive groups, that patients are sick because of their sins, including their lack of self-restraint, has been largely abandoned in the Western world. Even in the case of alcoholism, it has long been felt that lack of self-restraint was not a sufficient explanation for habitual overdrinking. But a stern censorious attitude or a pityingly superior one with respect to habitual overeating is still, in effect, frequently encountered and is disappearing only as the search for deeper causes progresses.

Because, in this search, and in this change of the old attitude toward a more properly clinical one, it may not be too presumptuous of me to think that our various types of obese mice and other experimental animals have played a role, I would like to discuss findings which may have no immediate application to your day-to-day professional problems.

APPETITE, HUNGER, AND REGULATION OF FOOD INTAKE

Before we consider why some experimental animals and patients become obese, it seems necessary to reflect first on the mechanisms whereby the majority of animals and men maintain a constant body weight without any particular conscious effort. There, one is immediately drawn into a discussion of such words as appetite, hunger, and regulation of food intake. "Appetite" may perhaps best be defined as the fairly pleasurable group of sensations and perceptions which make the individual receptive to, and desirous of food. "Hunger," in man, has a more acute meaning; it is the unpleasant feeling of being in dire need of food. Behaviorally, in animals, it symbolizes the unrest and apparent anxiety which accompanies prolonged deprivation of food; "hunger" gastric contractions in animals and man become painful as deprivation continues. "Regulation of food intake," on the other hand, is not necessarily associated with psychologic or behavioral characteristics; it is the over-all regulation whereby the energy needs of the body are satisfactorily covered by food intake. Gasnier and Mayer (2) have suggested, on the basis of their pioneer work, that two regulations might supplement each other, a short-term regulation which may cover approximately immediate requirements and a long-term regulation which may maintain near-constancy of body weight and fat reserves.

Appetite, hunger, and the short-term regulation are affected by a number of factors: gastric distension, sudden exposure to heat, the action of certain "appetite depressing" drugs, fear, rage, and sudden violent exercise will momentarily decrease, if not eliminate, hunger and appetite and disturb the regulation of food intake. But it stands to reason

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that the normal physiology of the organism, so dependent on the regulation of energy intake and output, could not long endure if, parallel to these quick-acting factors and surviving them, there was not a deeper mechanism regulating intake.

At this level, too, some facts are beginning to be known and pieced together. Recent work (3, 4) has shown that there are symmetrical "feeding" centers in the anterolateral hypothalamus. Destruction of these centers causes anorexia; their excitation causes bulimia (voracious, short-duration eating).

THE GLUCOSTATIC THEORY

Search for the physiologic stimulus to these centers has resulted in the elaboration, in the author's laboratory, of the "glucostatic" scheme of regulation of food intake (5). Briefly, this theory postulates that satiety occurs during active utilization of blood glucose by appropriate hypothalamic receptors situated in the feeding centers, and that the desire for food is felt only when the availability of glucose to the glucoreceptors is curtailed. Both low blood glucose (absolute hypoglycemia) and impairment of utilization—in particular, blocks to the phosphorylation of glucose (metabolic hypoglycemia)—could thus be expected to increase appetite.

In experimental animals of various types, it could be shown that lack of availability of glucose correlated well with food intake. In experiments with human subjects, normally fed, calorically underfed, diabetic, cortisone-treated, and so on, it could be further shown that arteriovenous differences could serve as a convenient index of availability or utilization of blood glucose. (The uptake of inorganic phosphate, indicating phosphorylation, is another index.) Large arteriovenous differences ("Δ-glucose") correlated well with satiety; small Δ-glucose correlated satisfactorily with hunger (6).

Stunkard (7) has extended these observations to show that gastric ("hunger") contractions, as well as subjective feelings of hunger, were positively correlated with small Δ-glucose. He also showed that talking to patients about food cannot elicit gastric hunger contractions if large Δ-glucose is present; but they can be elicited if Δ-glucose values are small. Incidentally, these findings confirm the important role of psychologic factors, but show that they operate within a physiologic framework.

A further striking indication in favor of the existence of a mechanism such as that postulated in the glucostatic theory was given recently by Larsson (8), who showed that the feeding centers have a metabolism which differs from that of other parts of the hypothalamus. They are characterized by rapid depletion of phosphagens (high energy, phosphate-containing substances, such as creatine-phosphate and adenosine-triphosphate), after food absorption is completed. This, in turn, makes these centers particularly receptive to labeled glucose and labeled phosphate in the fasting stage.

The theory has advantages, for a glucostatic mechanism dovetails with other physiologic mechanisms in several ways: It is easily integrated among the homeostatic mechanisms which are all designed to maintain a sufficient supply to the brain of glucose, its only fuel. As glucose availability seems in turn to regulate the utilization of fat (9) and of protein (10), it articulates the mechanism of food intake with over-all regulation of mechanism within which it has to work. And, finally, as stores of carbohydrates in the organism, unlike stores of lipids and of proteins, are limited (a few hundred grams of liver and muscle glucogen), it gives an interpretation for the fact that the regulation of food intake proceeds by frequent meals.

On the other hand, it is not certain that the theory can account for the extreme constancy of weight over a long period of time, or the eventual stabilization of appetite and weight in the "static" phase of obesity. Recent work on the turnover of fatty acids in normal animals as well as in different types of experimental obesity (11) suggests that as fat depots increase in size, a larger amount of endogenous fat (the exact amount depending on the animal species and, for obese animals, on the type of obesity, where the latter may start from a smaller than normal amount) may eventually be oxidized daily, thus sparing carbohydrates and cutting down automatically on appetite. Such a mechanism would provide a physiologic mechanism for the long-term regulation of appetite and body weight, as well as explain why the appetite of obese animals eventually decreases, the high level being restored only if the fat depots are cut down by starvation.

CONSTITUTIONAL OBESITY: "REGULATORY" AND "METABOLIC" TYPES

Whether the glucostatic theory, supplemented perhaps by the theory on the long-term "lipostatic" mechanism, is eventually retained or not, the scheme presented above illustrates the complexity of the mechanism of regulation of food intake. Such a mechanism is vulnerable, in particular, to: any disturbance in carbohydrate metabolism; to disturbances in fat and in protein metabolism because of the sparing effects of these metabolites; to disturbances in electrolyte metabolism because of their effect on the electrical phenomena in the receptors; to increase or decrease of activity beyond the limits of adjustment of the normal regulation (see below for examples of "inactivity" obesity); to dysfunction of the hypothalamic centers; and to faulty integration of hypothalamic impulses. (As an example of the last category, one can cite Stunkard's observation of schizophrenics, who will deny that they are hungry even when powerful gastric contractions are being recorded by the kymograph.)

The author, together with T. B. Van Itallie, is suggesting two new terms, which we believe will permit a useful classification of obesities. We propose to call "metabolic" hyperphagia (and "metabolic" obesity), the hyperphagia and the obesity resulting from a metabolic error situated lower, in the over-all mechanism, than the hypothalamic feeding centers. Such an error is compatible with normal function of the higher centers.

By contrast, we would call "regulatory" obesity that which is characterized by a dysfunction of the feeding centers, a faulty integration of their impulses, or a faulty cortical integration of these impulses. These two types would, then, be the components of what is sometimes called "constitutional" obesity, which may be in turn the consequence of genetic determinants or traumatic alterations (12).

Environmental factors may allow distinguishing a third type of mechanism. For example, "inactivity obesity" results, as will be shown later, when a normal organism (normal as regards metabolism and appetite regulatory processes in the "normal activity" zone) is made to operate below this normal zone, in the "sedentary" or "immobilization" range.

A clear example of "metabolic" obesity will be considered below, in the hereditary obese hyperglycemic syndrome. "Regulatory hyperphagia" is seen, for example, when the feeding areas of the hypothalamus are stimulated; or in psychogenic obesity. It may be noted that the exact status, whether "metabolic" or "regulatory" of some of the forms of traumatic obesity recently studied (such as goldthioglucose and central-hypothalamic lesions induced obesities) is still in doubt (*Fig.* 1).

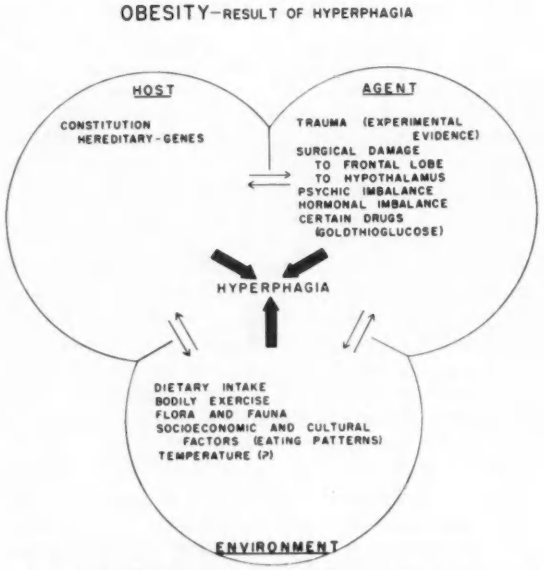


FIG. 1. *A schematic representation of the interaction of genetic, traumatic, and environmental factors in obesity.*

MULTIPLE ETIOLOGY OF OBESITY

A number of forms of obesity have been studied in the laboratory. Mendelian dominant (yellow) obesity in the mouse, hypothalamic obesity in rats and cats, thalamic obesity in the monkey, and recessive Mendelian obesity in the Shetland sheep dog have been described (12).

In the author's laboratory, a new Mendelian recessive syndrome, the hereditary obese-hyperglycemic syndrome of the mouse has been intensely studied and recently reviewed (12–14).

This syndrome is characterized by: extreme adiposity (a weight up to four times the normal), moderate hyperphagia (about 25 per cent), an abnormal pattern of food choice, low oxygen consumption with respect to body surface, and an extremely low level of spontaneous physical activity which antedates the development of the obesity. From the point of view of intermediary metabolism, the syndrome is characterized by high blood glucose and cholesterol levels, both of which are extremely sensitive to growth hormone. One also observes a drastic shift toward fat synthesis, which continues to be marked even under conditions such as underfeeding or fasting, which normally inhibit it almost totally. The amount of endogenous fat burned daily when the animals are allowed to consume food *ad libitum* is significantly decreased. The most striking histologic abnormality is seen in the pancreas which shows enlarged and degranulated islets. Yet in spite of this and the hyperglycemia, the insulin content is greater than normal. Certain drugs which affect the pancreas induce a temporary correction of the syndrome.

A long series of experiments has allowed us to propose tentatively that the primary lesion in this syndrome is a hypersecretion of a hyperglycemic factor, probably pancreatic, which in turn causes a hypersecretion of insulin. While this secondary insulin hypersecretion cannot keep up with the primary hypersecretion of the hyperglycemic factor (hence the high blood sugar), it is responsible for the increased synthesis of fatty acids and cholesterol.

An illustration of the effects of this shift toward fat synthesis even in unfavorable circumstances is provided by the demonstration by Alonso and Maren (15) that such genetically obese animals, underfed for a period of months to the extent that they weighed 30 per cent less than their nonobese littermates, still contained five times as much fat as the latter. Such an experiment shows clearly the complexity of the supposedly "simple" relationship between overeating and overweight in cases of metabolic obesity.

Of particular interest from the viewpoint of the multiple etiology of obesity is the fact that, in the course of the last two years, work pursued in our laboratory has made it possible to induce two different forms of obesity in the littermates of these

genetically obese animals (14–16). A single injection of the appropriate dose (LD_{50}) of goldthioglucose results in a type of obesity which, while marked by a similar degree of adiposity, does not show hyperglycemia and shows a cholesterol level which is hardly increased. Blood glucose and cholesterol levels do not respond to growth hormone. The positive energy balance is arrived at by an altogether different combination of factors: considerable hyperphagia (50 to 75 per cent), an oxygen consumption which roughly follows the "surface law" (normal B.M.R.), and a normal degree of spontaneous activity. The characteristics of fat metabolism also differ drastically from those seen in the hereditary obese-hyperglycemic syndrome: in this case, increased fat synthesis is entirely dependent on increased food intake. If the food intake is restricted, fat synthesis is normally inhibited (11). The amount of endogenous fat burned daily by goldthioglucose animals fed *ad libitum* is a little smaller than that burned daily by the nonobese.

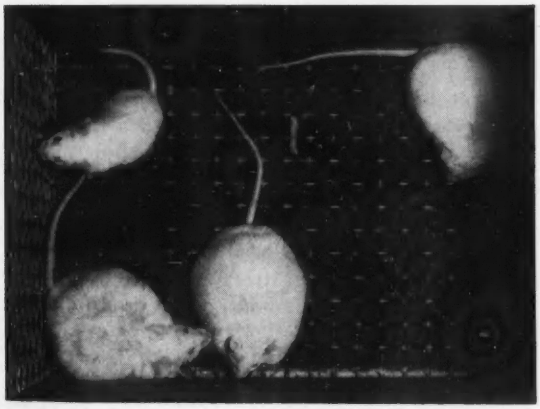
Finally, in the course of the past few months, hypothalamic obesity has been produced in mice and, in particular, again in thin littermates of genetically obese mice (17). Such animals achieve their positive energy balance through considerable hyperphagia (50 to 100 per cent), normally increasing oxygen consumption with body surface, and decreased activity. From the point of view of fat metabolism, the main characteristics are, again, the relative inertia of depot fats and a lipogenesis increased mostly in proportion to hyperphagia, though an independent increase in some situations cannot be ruled out (11). The blood glucose level picture is normal. The possibility that one is dealing here not simply with a purely neural "release" phenomenon, but with a syndrome at least in part mediated through over-all disturbances of metabolism has been discussed elsewhere (12, 14).

The fact that the three forms of obesity, which can be produced in littermate animals (see illustration), differ so drastically in the way in which a positive energy balance is achieved, in fat metabolism, and in other metabolic characteristics is a striking demonstration of the proposition that obesity admits not only of a multiplicity of primary origins but also of a multiplicity of developmental mechanisms.

ENVIRONMENTAL FACTORS—DIET AND ACTIVITY

The role of various environmental factors, such as the nature of the diet, environmental temperature, and so on, has received greater attention in the past few years, both in animal and human obesities and has been recently reviewed (12). Of particular interest is the demonstration that different types of obese animals and different strains of normal mice do not respond similarly to various types of diets.

For example, most strains of mice show only a transient increase in food intake when switched from a high-carbohydrate to a high-fat diet, but at least one strain shows a permanent increase leading to obesity. In yet another strain, there is a permanent increase in energy expenditure accompanying the increased intake so that the weight stays normal (18). Goldthioglucose and hypothalamic obese mice accumulate the greatest amount of weight on high-fat diets (17, 19), while mice with the obese hyperglycemic syndrome gain weight most on high-carbohydrate diets (20). In obese mice, "reducing diets," i.e. diets causing spontaneous weight loss or minimum weight gain, depend on the type of obesity: high-protein diet for goldthioglucose and hypothalamic obesities and high-fat diet for genetic obesity. In man, obesity does not correspond to a unique pattern as regards food choices (21).



A thin mouse (upper left) with littermates illustrating hypothalamic obesity (top right), goldthioglucose obesity (bottom left), and the hereditary obese hyperglycemic syndrome (lower middle). Mesh is made of ½-in. squares (1.25 cm. x 1.25 cm.).

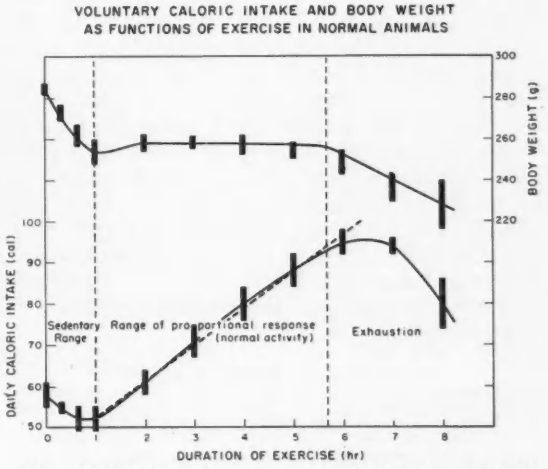

VOLUNTARY CALORIC INTAKE AND BODY WEIGHT
AS FUNCTIONS OF EXERCISE IN NORMAL ANIMALS
DAILY CALORIC INTAKE (cal)
BODY WEIGHT (g)
DURATION OF EXERCISE (hr)
Sedentary Range
Range of proportional response (normal activity)
Exhaustion

FIG. 2. *Relation of exercise, caloric intake, and body weight in normal animals (normal weight-acclimatized rats exercised on the treadmill for various lengths of time).*

Differential reactions to temperature can also be evidenced in various types of obesity (22).

The role of exercise in weight control has too often been minimized (23). This role can be easily demonstrated in experimental animals (24). In particular, it can be shown that food intake varies as a linear function of activity only within a certain range, which can be properly termed the range of "normal activity" (*Fig.* 2). Below this zone, in the "sedentary" range, a decrease in exercise is not accompanied by a decrease in food intake; instead, adiposity follows. Above the range of "normal activity," in the "exhaustion range," again intake does not increase with activity. Different types of animal obesity are characterized by different spontaneous activity patterns; in the hereditary obese-hyperglycemic syndrome, it has already been mentioned that lack of spontaneous activity plays a primordial role (13). The waltzing gene, which increases activity by impelling the animals to run in circles in their cage, or enforced activity on the treadmill (14, 24) will restrict weight gain in this syndrome. In other forms of obesity, also, exercise can be used to check weight gain (17).

In man, a study conducted by the author last summer on an industrial population of West Bengal demonstrated the existence of a "sedentary" range, where, again, decreasing activity was not accompanied by decreased food intake but corresponded to increasing degrees of overweight. These people showed a particularly wide range of physical activity (from bazaar tailors and clerks to coolies carrying twice their body weight on their heads for 9 hr. a day) and weight (67 lb. to 198 lb. for the same height). Economic differences, cultural, religious, and ethnic appurtenances could be eliminated as possible disturbing factors, leaving the relation between exercise, intake, and weight similar to that previously demonstrated in experimental animals. Similarly, a comparative study of obese and nonobese high school girls, undertaken in collaboration with Johnson and Burke and conducted with due regard to the difficulty of obtaining reliable caloric intakes (25), particularly when applied to obese subjects (21, 26), showed that in most cases, the striking factor in the positive energy balance in the obese girls was not hyperphagia but a drastically decreased activity. In their schedules, considerably more time was devoted to "sitting activities" (e.g., television watching) and far less to active sports. Energy output, as well as energy intake, must be considered if proper understanding of the energetics of obesity is to be achieved.

WE ARE ALL EXPERIMENTING

We know little about the causes and mechanism of obesity in man. We know only a little more in the case of experimental animals, and what we learn from them should lead us to be very cautious in our statements. These experimental studies show

- . . . that a number of different genes, probably working by different mechanisms, lead to obesity;
- . . . that hormonal factors, some of which are as yet not known with precision, are implicated;
- . . . that neural, enzymatic, and humoral lesions also may be involved;
- . . . that certain diets will influence certain types of experimental obesity toward a greater rate of weight accumulation, while they cause spontaneous reduction of weight in other types;
- . . . moreover, that certain diets will by themselves interact with a certain genetic background to lead a strain of animals to hyperphagia and obesity, while leaving other strains unaffected;
- . . . that certain chemicals will cause weight loss in some special types of obesity, while leaving other animals unaffected;
- . . . that exercise plays a role of different importance in different obese syndromes;
- . . . that fat metabolism differs in its most essential characteristics in different types of obesity.

All this should induce us to shun these often encountered dogmatic statements ("Genes have nothing to do with overweight." "Hormones are not concerned in 95 per cent of all cases of obesity." "Exercise is of no value in reducing"). Such statements carry little conviction, because they do not fit observable facts. Think of the farmer who wants to produce fat animals and first of all very carefully selects obese strains of pigs, geese, and so on (genes), implants estrogen pellets in his capons and castrates his cattle (hormones), and makes sure that the animals he fattens are prevented from running around and are cooped or penned up (immobilization). After all, he has learned other aspects of nutrition from animal husbandry. He doesn't even have to go to laboratory animals to check some of the "health education material" on obesity. Pioneer studies of the genetics of human obesity; demonstration of similarities between the obese hyperglycemic syndrome of mice and the middle aged, obese, insulin-resistant type of human diabetes; and studies of activity in human obesity all directly challenge these statements.

It is all so unnecessary. What we *do* know and can safely say is that if intake is decreased while activity is maintained, or if intake is maintained while activity is increased—or if, better still, intake is decreased and activity increased, the individual will lose fat. Exercise, when it is possible to increase it, should be increased gradually and practiced regularly. Various types of patients will be able to practice and will like different activities—walking, swimming, and so on—and an effort should be made to find a satisfactory type of exercise. Diets will be successful if patients don't feel too hungry while on these diets and "stick" to them, which means that they must be reasonably attractive, not too expensive, and above all, sufficiently satisfying. From what we have seen

of the multiplicity of types of obesity, again we may expect that different patients will react differently, not only because of psychologic factors or habits, but perhaps because of physiologic factors as well. Just as some mice will spontaneously lose weight on high-protein diets, and others on high-fat, some diets may be more successful than others with certain patients, not because the patients are contrary, but simply because they are different. Swimming may attract a young obese girl because it is a sport she does easily and well; it may repel another because she feels self-conscious in a bathing suit. A high-protein reducing diet seems to be satisfying to many; to others, a low caloric diet which does not contain a high proportion of fat is unendurable.

In dealing with obesity, we should first abandon explicit or implicit judgment of values, superior attitudes toward a supposed lack of self-restraint, and generally speaking, any vestigial remains of the belief that the sick (here, the obese) are sick due to their weaknesses and sins. (After all, are we that sure of our perfection?) Second, we should dispense with pompous and unproved (or untrue) statements about genes, hormones, and so on, about which we know so little and which are, for the time being, beside the point anyway. Third, we should remember that human beings are different and should not be forced to conform to one philosophy, one mode of life, or one type of reducing diet. And finally, we should humbly and methodically experiment with what we have, various types of low-caloric diets, perhaps starting with one of the high-protein type but not averse to trying another of the same or a different type if the first does not succeed. We should also experiment with various ways of stepping up activity, if it is not medically unadvisable.

In the therapeutic field, success does not consist in feeling that one is right and the patient wrong, but as Laennec put it, in "curing sometimes, alleviating suffering often, and comforting always."

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World Wide Opportunities[1]

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HOW competent are we to evaluate the nutritional problems of a foreign country and make appropriate solutions? What are some of the major nutritional problems and what should be done about them? Where is our knowledge reasonably satisfactory and where are there serious questions?

For purposes of discussion I should like to present some typical results of the dietary surveys which my colleagues in Peru have collected (1). These data were collected by recording food intakes on a family basis over a one-week period. The family requirement was estimated from current nutritional standards (2) depending on the family size and composition. It is apparent that a rather large number of the families are consuming diets which fail to meet recommended levels. Calcium and riboflavin appear to be the major problems, according to this analysis, followed by vitamin A, thiamine, and protein. "Poor" diets the world over usually show some similarities. Lack of money is often a major factor, and the more expensive foods are eaten in small amounts. These are ordinarily the products of animal origin—meat, milk, and so on—which are the major sources of animal protein, calcium, and riboflavin. Thiamine may or may not be critical, but it seems to me that protein, calcium, and riboflavin deserve special consideration because they are almost universally low and the food sources which supply them are not easily available. As the study shows (Table 1), one also finds low intake of other nutrients but the problem of supply, with the exception of thiamine where it is low, does not seem so critical. Low intakes of vitamin A and ascorbic acid occur where various yellow vegetables, such as squash and sweet potatoes, and several fruits are cheap and usually available.

If problems exist with regard to nutrients which are available to the people, considering both availability in the market and the economic possibilities of the population, the main job becomes one of nutrition education. Undoubtedly a major part of the whole job is one of education. Others can speak better than I of the special problems of nutrition education in areas where illiteracy is high and little money is available. However, we do feel that this education should be based on a thorough knowledge of the food habits and foods available within the particular region. In Peru, for example, the high Sierra area is completely different from the others—culturally and with regard to the nutrition problems, the food habits, and the available foods. There is considerable doubt that the nutrition education literature prepared in the United States is useful in many foreign countries. It may not only be useless, it may actually be harmful to the nutrition program if the recommendations are impossible to achieve.

I should like to speak particularly about the problems of calcium, protein, and riboflavin since it appears that if we want to raise the levels of consumption of these nutrients appreciably, great changes in agricultural production in these countries will be necessary. It is extremely important, therefore, to be sure that such changes, if they are recommended, will yield a satisfactory return in terms of health. We must remember that many areas of the world are not well adapted, at least at present, to the production of milk and animal products. Sanitation is poor. Transportation is poor. The understanding and the methods of handling perishable foods such as milk are lacking. The climate is often ill-suited for animal production. The coast of Peru is a desert which only blooms when water is available for irrigation. Then cash crops of high return, such as cotton and sugar cane, can be grown. An extensive dairy industry in this area would have to compete with these cash crops and apparently the cost would be high. Numerous problems must be overcome before some of the tropical areas, such as the Amazon valley, could be productive of animal crops. Some of these are being overcome with agricultural research and improved

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transportation, but the general character of the food habits will probably not be drastically changed for some time. Peru is used here only as an example familiar to the author; similar problems face much of the world. It seems only logical that, in the face of these problems we should try to build on the present practices, pin point those deficiencies which are the most acute and the correction of which will give the highest return in terms of health for the expenditure of time, money, and personnel—rather than to recommend dietaries similar to those we find desirable and acceptable in the United States.

With only the evidence that certain cultures such as we find in Peru have developed and survived for many years, we must conclude that life, a reasonable degree of health, and hard physical labor are possible in the face of dietaries such as I have indicated—conditions in which the great majority of the population are consuming diets which contain less than the recommended amounts of calcium, protein, and riboflavin. In the broad sense of the word, these people must be considered as adapted to their dietary conditions. Otherwise, they would long since have disappeared from the world. Is this desirable or undesirable? Are they deficient in these nutrients? If so, how acute is the deficiency and how much benefit will they derive from increased intakes? These are the kinds of problems that urgently need answers. I do not claim to have the answers, but the available evidence may be disconcerting to many of us.

CALCIUM REQUIREMENTS

I should like to point out to you that the only evidence available on which we may judge the calcium requirements of adults has been obtained by balance studies. We assume that once adulthood is reached and growth essentially ceases, the body no longer needs to store calcium. Then, if we feed different levels of calcium and measure the excretion, we can determine that amount at which the intake equals the excretion. The body would then be neither storing nor losing calcium, and this should be the calcium requirement.

Data collected in this country by Sherman (3) and particularly Mitchell and his colleagues (4, 5) are in reasonable agreement; if we plot intakes and excretions, we find that the average amount required for balance is about 0.6 to 0.7 gm. calcium per day (*Fig.* 1). At lower levels, the excretion exceeds the intake and the tendency is toward a negative balance. At higher levels of intake, some calcium is stored.

Now if one does the same type of experiment in Peru (6), one finds that the general principle holds, but the population is simply in equilibrium at a lower level of intake. In the Peruvian subjects, the average requirement for balance was only about 0.2 gm. per day (*Fig.* 1). Data from other countries where calcium intakes are habitually low are in substantial agreement with these findings (7).

DOES INTAKE DETERMINE NEED?

Thus one finds that if we use the same techniques to study calcium requirements in Peru which we have used to determine calcium requirements in this country, one comes out with a very low figure. If we place any reliance in our method, these people are not calcium deficient. If we refuse to accept these findings as evidence that calcium intake is satisfactory in Peru, then we repudiate our method.

In retrospect (and hind sight is always better than foresight), it is obvious that we should have

TABLE 1

*Family intakes of nutrients at the Hacienda San Nicolás in Peru compared to recommended intakes**

NUTRIENT	NUTRITIONAL RATING						RANGE OF VALUES (PER CENT OF RECOMMENDED ALLOWANCES)
	Poor†		Fair‡		Good§		
	Number of families	Percentage	Number of families	Percentage	Number of families	Percentage	
Calories	6	17	12	34	17	49	51–202
Protein	10	29	13	37	12	34	39–265
Calcium	33	94	2	6	0	0	12–93
Iron	1	3	11	31	23	66	74–385
Vitamin A	16	46	1	3	18	51	14–550
Thiamine	16	46	12	34	7	20	46–176
Riboflavin	26	74	4	12	5	14	30–150
Niacin	5	14	3	9	27	77	38–328
Ascorbic acid	8	23	9	26	18	51	34–420

* Reprinted from Collazos *et al.* (1).
† Less than 75% of recommended intakes.
‡ 75 to 100% of recommended intakes.
§ Over 100% of recommended intakes.

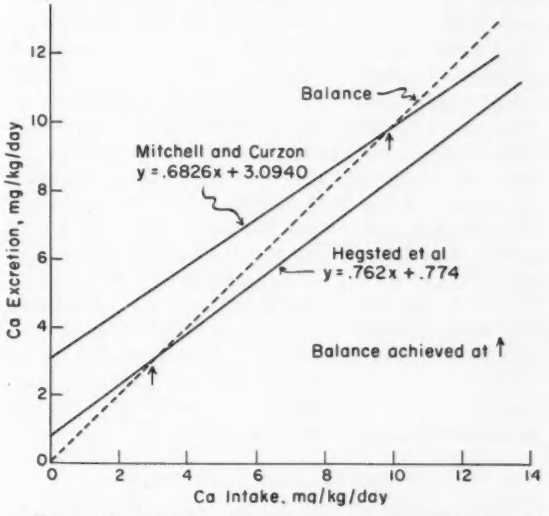

FIG. 1. *Relationship between excretion and intake in subjects studied in the United States by Mitchell and Curzon (4) and by Hegsted et al. (6) in Peru.*

expected these findings. If the people in Peru were in constant negative calcium balance, they would end up without any bones. This obviously doesn't happen. It must mean, of course, that calcium balance can be maintained on any diet on which people can live over long periods of time.

It is of interest to look at the other end of the scale. Even with the relatively high calcium diets that we consume, we do not continue to store calcium in any appreciable amount. If we did, we would have tremendous bones. In other words, we must come into balance at the level of calcium we habitually consume. Hence, it follows that if we should estimate the calcium requirements, by the balance method, of a population that is accustomed to 2 qt. milk daily or 2 gm. calcium, we might expect that their daily calcium requirement would approximate 2 gm. If this is a correct analysis, i.e., that the calcium intake determines the requirements for balance, then we have been on an escalator. We estimate the need and add a factor of safety. If we succeed in raising the intake, then the requirement would be raised. No limit would be in sight. The new allowances of the Food and Nutrition Board (8) have stopped the escalator.

What else can we look for as evidence of an insufficient calcium intake in a population? Clinical calcium deficiency is apparently very rare in all parts of the world (9). Limited analyses of the bones from "low calcium areas" do not indicate an insufficient calcification (10), although the skeletal structure is generally small. The rate of bone development may be delayed (11). We are not sure of the cause, but there is good reason to believe that the calcium intake is not the determining factor. It might be suspected that, in areas where the calcium intake is low and the phosphorus intake high, rickets would be more prevalent or that the vitamin D requirement would be high. Rickets is not a major problem in many of these areas, so that if the vitamin D requirement is high, it is presumably covered by sunlight. I am forced to the conclusion that in spite of calcium intakes far lower than we currently recommend in this and other countries, we actually have little, if any, basis for concluding that calcium is a serious problem in the world as a whole. And I reach this conclusion well aware that practically every nutrition conference in this country in recent years has concluded that the lack of calcium is a major problem in the United States. Logic would apparently demand a good deal of study to determine the facts before we institute large nutrition programs, educational or agricultural, to raise the calcium intake either here or abroad.

THE PROTEIN PROBLEM

Now I should like to consider the protein problem. Animal protein intakes are low in most of the world and certain populations, such as those of the Sierra of Peru, are for all practical purposes vegetarian. Meat, milk, eggs, and so on, are available only occasionally, usually as a special treat during a fiesta. Are these populations deficient in protein? Or do they have special foods that are better in protein than we might suspect? At least in some areas, special vegetable sources of high biologic value are available. The grain or seed consumed in Peru and Bolivia called *quinua* (*Chenopodium quinoa*) has a rather high protein content, around 15 per cent. In rat growth studies (12), the proteins of this grain were found to be equivalent to the proteins of skim milk powder. Thus, a vegetarian diet may have possibilities that we often ignore. But in many areas, the quality of the proteins consumed does not appear to be very good.

It has been known for many years, at least since the work of Sherman (13) and Hindhede (14), that nitrogen balance could easily be maintained at an intake of 0.5 gm. protein per kilogram of body weight per day. This finding has been confirmed many times (15, 16), even with diets entirely of vegetable origin. When better quality proteins are used, the need to maintain balance is even less. Those who have worked on nitrogen balance studies will know that the difficult job is to devise diets which are sufficiently low in protein to produce more than a temporary period of negative balance. We concluded several years ago that if sufficient cereals and vegetables are consumed to supply the required calories, protein deficiency in the adult is unlikely (15). I can still find no reason to change this conclusion. But even this minimum is probably not reached by many people.

On the other hand, the situation with children and perhaps with pregnant and lactating women is entirely different. There is good reason to believe that protein malnutrition in children is one of the major nutritional problems in the world today. The disease or diseases called kwashiorkor, sindrome pluricarencial infantil, malignant malnutrition, and so on, certainly is related to the consumption of low-protein diets although I do not feel that it is sufficiently well characterized to call it simply protein deficiency (17). The variation in clinical manifestations in different areas is sufficient to indicate some variations in etiology.

In any event, it occurs in children in the post-weaning period who are fed diets high in carbohydrate foods and low in good sources of protein. Actually there have been few if any careful studies of the dietary antecedents of the disease. Not all of the children develop the multiple deficiency syndrome so there must be hope in the local diets. The ultimate solution does not appear to lie in the importation of skim milk powder from the United States, nor—in the near future at least—on large increases in local meat and milk supplies.

There is an urgent need to characterize the

condition more thoroughly in terms of the nutrients involved and to determine quantitatively the protein requirements of children fed various vegetable protein mixtures. Since the question of protein requirements is intimately bound up with caloric intake and in many areas the condition of the infants indicates varying degrees of starvation, studies in this area would also be of much practical importance.

RIBOFLAVIN NEEDS

If we turn to riboflavin as the third of the nutrients chosen for discussion because the sources appear limited, the situation seems to be somewhat different. My personal feeling is that the riboflavin requirements of the adult in the United States have been reasonably well worked out. There is, as far as I know, no real evidence of adaptation to low riboflavin intakes, and riboflavin deficiency is probably a serious problem in much of the world. The intakes in many areas are below our estimates of the requirement and until studies are done on these kinds of populations, we will be skating on rather thin ice. If our present estimates are somewhat high for these populations, an increased consumption of green vegetables might meet the minimum need. On the other hand, if the need is as large as we currently estimate, the problem becomes very difficult. One automatically thinks of fortification. In some areas this could be easily done and controlled. In other areas where foods are largely produced locally and transportation is difficult, there may be no obvious carrier for a fortification program.

NEED FOR BETTER METHODS

Whenever one attempts to evaluate our knowledge of nutritional needs we immediately recognize that our methods are relatively crude. As I have indicated with regard to calcium, I think we need a completely new approach to the problem of requirements. Unfortunately this is not yet evident. Most of our studies have been of rather short duration. Undoubtedly further study of the dietary habits and nutritional status of different population groups will reveal "natural experiments" which will provide the opportunity for long-term studies. Hopefully, those in the field will be alive to the opportunities and ready to take advantage of them.

In speaking of natural experiments, one is of course reminded of the classical work of Orr and Gilks (18) and McCarrison (19) demonstrating in African and Indian groups marked differences which are undoubtedly related in large part to differences in nutrition. These same studies also emphasize my thesis, namely that it is all very well to say that the meat eaters are superior to the cereal eaters, but to be of much practical use we must actually know the quantitative requirements. What are the exact nutrients involved in these differences and how much protein, riboflavin, or whatever the important nutrients may be, must we add to the diets of the cereal eaters to make them nutritionally adequate? Until such data are available, we can calculate neither the magnitude of the problem nor the means to meet the deficit.

At the same time we should all be concerned with the accumulation of recent figures which indicate the relatively unfavorable situation enjoyed by the adult population of the United States and similar areas with respect to life expectancy after forty, due to heart disease, diabetes, and cancer (20). Studies of Keys and others (21) have indicated there is good reason to implicate dietary habits. If we in the nutrition field wish to take credit for certain improvements in health during the last few decades, we also must be prepared to shoulder some responsibility for unfortunate happenings, at least until proved otherwise. McCance (22), in reviewing some of the work in Germany after the last war, points out that the children were shorter, lighter, and bone development delayed compared to English children of the same calendar age. Within a year after the diets were "improved," principally by adding more bread, weight, height, and bone age were nearly the same as those of English children. To quote McCance, "This may have been a nutritional triumph, but further reflection leads me to suggest that we may have taken six to twelve months off those children's expectation of life by feeding them this way." "The race is not [necessarily] to the swift nor the battle to the strong . . . but time and chance happeneth to them all" (Ecclesiastes 9:11). We may be shortening the lives of the generation now growing up in this country by trying to make them grow faster with school meals and school milk.

TABLE 2

*Comparison of daily dietary recommendations in the United States, Canada, and Great Britain**

COUNTRY	CALORIES	PROTEIN	CALCIUM	IRON	VITAMIN A	THIAMINE	RIBOFLAVIN	NIACIN	ASCORBIC ACID
		gm.	*gm.*	*mg.*	*I.U.*	*mg.*	*mg.*	*mg.*	*mg.*
United States (National Research Council)	3200	65	0.8	12	5000	1.6	1.6	16	75
Canada	2900	60	0.65	6	4600	0.9	1.4	8.5	30
Great Britain	3000	87	0.8	12	5000	1.2	1.8	12	20

* For moderately active adult man, twenty-five years of age, weighing 65 kg.

NUTRITION STANDARDS

I should also like to point out to you the rather marked differences which occur in the dietary recommendations from the United States (8), England (23), and Canada (24) (Table 2). You will note rather good agreement for some nutrients, but large differences in the recommendations for others. Strangely enough, there is rather good agreement for at least two of the nutrients discussed here and for which I have expressed considerable doubt as to our knowledge of requirements. Much has been written about the difference in philosophy behind these different recommendations; the words "buoyant health," "nutritional floors," and "average person" occur. The important point, however, is that *all three* of these recommending groups used essentially the same data as a basis in arriving at their recommendations. They all expect that intakes of the magnitude given will maintain good health in their populations. We will prefer the recommendations of our own committee, but we must be aware of the fact that these differences are due largely to the philosophic approach of the three groups and thus, to a considerable extent, fall outside of science.

We should remind ourselves occasionally that all of the conclusions which we who call ourselves scientists arrive at are not necessarily scientific. Science actually includes only those things arrived at by application of the scientific method. The scientific method has been defined by Otto (15) as "a way of investigation which relies, and relies solely, on disciplined empirical observation and rigorously exact proof. Its aim is objective verification. And by objective verification is meant, first, that the investigator's wishes and wants, his aesthetic, moral, or religious predilections, his faith in or desire for a particular conclusion, have been carefully eliminated as determining factors; and second, that proof extends beyond inner or personal conviction, to outer or public demonstration." I wonder how many of the dietary standards meet this definition. How much faith, desire, and inner conviction would we find in them if we could make a completely objective evaluation?

The world seems to be in the midst of a plague or epidemic of "committeeitis." Any perplexing problem for which we desire an answer, whether we have the background to determine the answer or not, requires a committee. Once the committee is formed, the members are duty bound to turn in a report, and few committees have the fortitude to report that they cannot reach a solution or that they had no business being formed in the first place. The reports, if accepted by the proper authorities, have an unfortunate way of becoming the law. We all know, for example, that by official definition vitamin A has twice the biologic activity of beta-carotene. This is nice and convenient and makes us feel free to convert one to the other and back again, and do all kinds of tricks. But this definition does not change one bit the disturbing fact that there is abundant biologic evidence that the activity of vitamin A and carotene are not always in this proportion. In other words, the answer to the question of how much carotene it takes to equal one unit of vitamin A activity is not yet available to us. The definition is only a generality, a sort of average, that may have little reality a good share of the time.

Our dietary standards are somewhat similar. They are important tools; they have been extremely useful. But, it is important that we recognize their authority and lack of authority. We must not be lulled to sleep, perchance to dream that all is well, simply because the dietary recommendations exist.

WHAT ARE OPTIMAL INTAKES?

The widespread concern over obesity at present and the impressive work of McCay and his associates (26) and others which indicate that some degree of under-nutrition is beneficial in longevity studies should lead us all to question the "more the better" attitude that has been practically traditional in nutrition. In all likelihood there is an optimal intake for each nutrient, and this may not be the maximum that can be achieved.

A curve relating health to nutrient intake might appear as the hypothetical curve shown in Figure 2. At very low levels, an increase in intake is of little use because the minimum requirement has still not been reached. At somewhat higher levels one reaches a point where great improvements are obtained with relatively small increases in intake. Then the curve flattens off, and finally the optimal intake is reached.

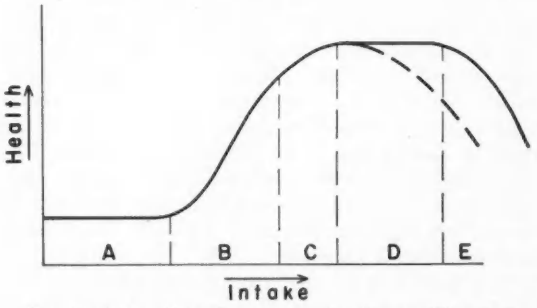

FIG. 2. *A hypothetical curve showing the possible relation between the degree of health and level of intake of a nutrient.*

How wide the area D may be for different nutrients is not well known. For calories, it is probably not very wide, and the curve may be more like the dotted line with detrimental effects beginning soon after the optimum is reached. With the vitamins A and D it is sufficiently narrow that excesses occur too often. With several other nutrients we feel rather confident that it is not narrow. But as our methods become more acute and we begin to define optimal nutrition with more exactness, the area D may become

increasingly narrow. In any event, if we are to be maximally effective, it is necessary that we eventually define this curve with considerable exactness. We must realize that the over-all nutrition job in many parts of the world will probably not be accomplished in any short period of time. If the intake of certain nutrients falls in area B, while others are in area C, it is clearly those nutrients in area B which deserve the primary effort.

A few years ago when I first arrived in Peru I was presented to the Minister of Health. He was a big fellow, probably 6 ft. and 200 lb. He looked me over and said something that sounded like, "Un experto en nutrición! No creo!" Roughly translated this means, "If he's an expert in nutrition, you have to show me!" The purpose of this story is not to present myself as an example in nutrition which I'm sure you wouldn't accept anyway nor to belittle whatever abilities I may have. Rather I wish to point out that the words "good nutrition" conjure up in the minds of most people, including those in the profession I believe, something resembling the little pig that went to market. In spite of current trends, it still means something at least reasonably round and poly.

The agriculturalists are still way ahead of us. If you will look at a well nourished dairy cow, you will see a rather boney, angular creature that may be well fleshed, but this means something entirely different than the same words applied to a beef cow. I do not know which we resemble, dairy cows or beef cows. And, I hasten to add that I am not really comparing any of you to dairy cattle or beef cattle or any other kind of creature where you may consider the comparison odious. The trouble is that we do not know what we are or what we really desire, except in the broadest terms. Until such time as the objective is crystallized, the means of achieving it will certainly be somewhat less than clear.

NUTRITION AND RESISTANCE TO DISEASE

Referring back to the studies which have shown that longevity, resistance to tumors, and so on, seem to be improved by a low plane of nutrition, it is rather intriguing to speculate on the possibility that the various objectives we might formulate may actually not be compatible with each other. It is possible, and I think perhaps even probable, that maximum resistance to certain infectious diseases may not be obtained by the same type of nutrition that will give maximum longevity or resistance to cancer. Under-nutrition of some kinds at least seems to prevent experimental poliomyelitis, whereas the opportunities for other infections, tuberculosis perhaps, may be increased (27).

Thus, even within the field of resistance to infectious diseases, optimal nutrition may require definition, depending upon the disease. It is possible, perhaps likely, that the type of nutrition desired may depend on the environmental conditions or the hazards to which the population is subjected.

As other medical and public health sciences progress and bring certain diseases under control, and other technical fields advance to change the environment and function of the human being, our own objectives in nutrition may need to change. Bigness as a means of producing more work per man or for protection has already been largely outmoded, although one can scarcely believe it during the football season. A better example may be found in those tropical populations which carry heavy infestations of intestinal parasites. We know practically nothing of the nutritional needs of such people, although there is reason to believe that feeding the parasite population is not an unappreciable job. Until such time as the sanitarians and other health officials eliminate the parasite population, the feeding of it falls within the domain of the nutritionist. After it is eliminated, which will be a long time in many areas I fear, we in nutrition will face other problems in these areas. Our objective may be changed. Or, if our objective remains the same, the means of achieving it will probably change.

I have not forgotten that we have accomplished a great deal in nutrition which we can view with pride. Deficiency diseases of most kinds can scarcely be studied in many parts of this country but most of the world is not so fortunate. It seems to me that our primary effort should be directed toward the elimination of frank nutritional disease. Our job is not to sell particular foods or particular dietary patterns. However, one approaches the problems in foreign countries, he should have a proper regard for the cultural patterns and agricultural and economic possibilities as they now exist. Work in foreign countries offers many opportunities to improve our understanding of basic nutrition. It is urgent that we take advantage of these opportunities if we are to develop realistic methods which will be effective in the areas where we accept responsibility, and if we are not to waste our limited resources of time, money, and personnel on objectives which will yield little in terms of health.

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The Overweight Population

Statistics indicate that today nearly twice as many men of the white population in the U. S. as women are overweight, according to Dr. James M. Hundley, Laboratory of Biochemistry and Nutrition, National Institutes of Health, Public Health Service. In speaking before the Weight Control Colloquium at Iowa State College on January 18, Dr. Hundley reported that men are now about 5 lb. heavier for their height and women about 5 lb. lighter than similar groups in 1912. The exceptions are Negro women who appear to be about 15 lb. heavier than in 1912.

He pointed out the need for long-term studies to determine the height-weight relationship in children to the eventual adult pattern of height and weight. "Personally," he said, "I believe the importance of maintaining proper weight for height should be taught beginning in childhood, although this belief is not based on a proved relationship between childhood and adult obesity."

Dr. Ercel S. Eppright of Iowa State College, speaking before the same group, also recommended initiating weight control programs in childhood, especially for girls. Studies in Iowa, she reported, have shown that thinness and stockiness are about equally prevalent with boys, but with girls, stockiness prevails in the teen-age groups. Approximately one-fourth of the adolescent girls in Iowa are very heavy or obese. At age twelve, variations in body size are great, for all children, but after that age, more girls tend to be overweight. Hence, at this age, nutrition education in relation to weight control should begin.

In trying to relate nutrient intake to body size, it was found that among larger children, consumption of most nutrients by boys increased significantly with their size, but that with girls, nutrient intake was only slightly related to body size. The nutrient-to-bodp-size relationships of boys and girls are very different. Undersized children had lower mean daily intakes of most nutrients than oversize children, except for teen-age girls.

Preservation of Foods by Ionizing Radiations[1]

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THE ten-year period from 1895 to 1905 is regarded as one of the most important in the history of modern physics. This span witnessed the discovery of radioactivity by Becquerel; the pioneering work of the Curies; and the discovery of X-rays by Roentgen. In this era, also, Einstein announced his now-famous theory predicting the equivalence of mass and energy—a theory that received experimental confirmation almost half a century later.

To the food scientist and technologist, this era also was of great significance, for the classic studies of Prescott and Underwood in Massachusetts and of Russell in Wiconsin marked the birth of scientific thermal processing. Moreover, the young food technologists of that era, such as Prescott, were familiar with the new discoveries of the sister discipline of physics, and in that same ten-year period they made the observation that the radiations discovered by Roentgen and Becquerel had the power to destroy microorganisms.

The 1930's and 1940's witnessed the development of equipment for producing intense beams of radiations, and work on the biologic effects of radiations was intensified. However, it was not until World War II, with the concurrent development of particle accelerators producing intense beams of radiations and availability of large quantities of radio-active isotopes, that intense research was begun on the bactericidal effects of ionizing energy which had been discovered almost half a century earlier.

Today, we have four primary methods of food processing: heat, dehydration, freezing, and chemical preservation. The radiologic developments cited above should, it is hoped, lead to a fifth method—radiation sterilization.

It is the purpose of this paper to attempt to explain the *raison d'être* of radiation sterilization and to describe this process, its present status, and its future.

Why "Cold Sterilization"?

One cannot help wondering why consideration is being given to a new method of food processing. In recent years there have been many advances in food science and technology. A trip to any supermarket or inspection of our own pantry and an examination of the health record of the nation indicate the tremendous progress made in foods. Frozen foods, prepared baby foods, new fats and oils, canned foods of superior flavor and nutrient value—all have been developed and improved by food scientists and technologists over the past twenty to thirty years. These foods have increasing acceptability and have given the homemaker better foods, better living, more convenience, and more time for other things. Why, then, radiation sterilization?

Samples of canned foods being inserted into the kilocurie cobalt-60 source of the Department of Food Technology at the Massachusetts Institute of Technology

[1] Contribution No. 213 from the Department of Food Technology, Massachusetts Institute of Technology. Presented at the 37th Annual Meeting of The American Dietetic Association in Philadelphia, on October 27, 1954.

The answer may be found in a consideration of the following: There are many areas where refrigeration is lacking in quantity or is so difficult to obtain as to be very expensive. Certain isolated areas and certain types of naval vessels, such as submarines, are examples of these. Many canned foods are of such consistency or size as to require excessive quantities of heat for sterilization—quantities far in excess of the amount deemed desirable for optimal flavor. It is for such reasons that many packers have turned with eager eye to the application of ionizing radiations as a potential means of preservation.

How Do Radiations Preserve Foods?

The preservation of foods by any means is predicated on the destruction of microbes or inhibition of their growth. Preservation of foods by ionizing radiations is based on the bactericidal effects of these radiations as discovered fifty years ago.

One of the fundamental properties of ionizing radiations, as the name suggests, is its ability to cause ionization in the medium it traverses. This ionization produces free radicals, both oxidative and reductive in nature.

Thus, a number of workers have theorized that the destruction of bacteria and other microorganisms may be effected by the passage of a single particle or quantum of energy at or near a sensitive portion of the cell causing a direct "hit" on this area, ionization of this sensitive region, and the subsequent demise of the organism. The rate of destruction of microorganisms due to direct hits is first order—that is, an exponential function. This, of course, is similar to the rate of destruction due to thermal energy.

In addition to the destruction due to direct hits, microorganisms are, to some extent, also destroyed indirectly by the free radicals produced by the radiations in the medium in which the organisms are suspended. It appears, therefore, that while no direct proof is at hand, evidence points sharply to the destruction of microorganisms by high-energy radiations being due directly and/or indirectly to ionization.

Types of Radiations

For reasons which have been adequately described elsewhere (1), cathode rays and X- or gamma radiation possess characteristics which make them practical for sterilization purposes.

Cathode rays are the tiny, sub-atomic particles of negative electric charge which swarm around the nucleus of atoms and are known as *electrons*. When these electrons are emitted from the cathode of an evacuated tube, in a man-made machine (or "particle accelerator"), are accelerated by a huge potential difference, and are taken out of the window of the tube, they are known as cathode rays. It is these cathode rays, emitted from the window of an acceleration tube, that are used to bombard the product.

If, on the other hand, these cathode rays are allowed to bombard a heavy metal target, a portion of their energy is transformed to *X-rays*.

Gamma rays are electromagnetic radiations having the same physical characteristics (and biologic and biochemical effects) as X-rays, but are emitted from the nuclei of radio-active isotopes during their disintegration.

Beta particles are *electrons* emitted from the nuclei of radio-active isotopes and have the same characteristics and effects as cathode rays.

X-rays and *gamma rays* have a great deal more penetration in matter than cathode rays or beta particles.

An example of the type radiation source used in radiation sterilization studies is presented in the accompanying photograph of the radioactive cobalt-60 gamma ray source used by the Department of Food Technology at the Massachusetts Institute of Technology for food sterilization studies.

Effect of Radiations on Matter

EFFECT ON MICROORGANISMS

It is well known that ionizing radiations can destroy all known types of microorganisms providing the material in which the microbes are suspended is within the physical penetration limits of the particular type of radiation. The dose or quantity of radiation required depends mainly on the type or species of contaminant, and secondarily on other physical or chemical factors involving the contaminant.

Figure 1 presents some data obtained in our department on various species of bacteria, sporulating vs. vegetative organisms. These data illustrate the degree of variation in radioresistance of various species of bacteria.

The radioresistance of some species of microorganisms may be varied to some degree by modifications in physical conditions during irradiation. Such factors as temperature, moisture content, and atmosphere, e.g., oxygen vs. vacuum, may modify the resistivity of the organism. However, of all these factors, the single item of greatest importance in the radioresistance of microorganisms is the particular species of organism.

EFFECT ON NUTRIENTS

Since radiations may cause ionization in the material which they traverse, it is logical to expect that nutrients may be affected—at least in the pure state.

Such has actually been found to be true. When vitamins or amino acids are bombarded in pure solutions, a certain degree of destruction may be observed, dependent on the sensitivity of the compound itself, the amount of energy to which it was exposed, and the nature and physical state of the medium in which it is present.

In general, nutrients are affected *indirectly* by

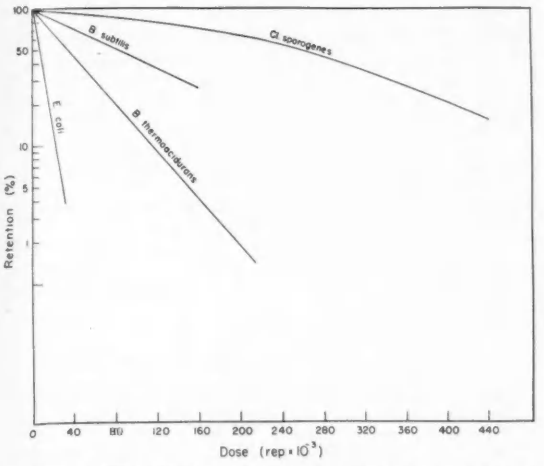

FIG. 1. *The relative radiosensitivities of four species of bacteria.*

radiations. These radiations produce free radicals in the solvent, and these radicals react with the nutrients.

This indirect effect of radiations on solutes in dilute solution may be recognized by the following characteristics:

(a) The dilution effect.
(b) The temperature effect.
(c) The protection effect.

These characteristics will be discussed below with illustrations from work on vitamins, amino acids, and enzyme systems.

The Dilution Effect. The greater the dilution of a given solute, the greater the destruction, percentagewise (*Fig.* 2 and 3). Thus, on a percentage basis, there is greater destruction in more dilute solutions. A given vitamin may be characterized in its reaction to a specific type of ionizing energy at a specified concentration by its "inactivation dose" (D_0) or that quantity of radiation required to inactivate or destroy 63 per cent of the molecules (37 per cent retention). If one divides the "inactivation dose" by the particular concentration employed, one obtains the "specific inactivation dose" (D_0/C). The D_0/C value is constant for a given compound in response to a given type of radiation and enables one to compare the relative radiosensitivities of various compounds to radiation. This is illustrated in Table 1 for various amino acids and in Table 2 for certain vitamins.

TABLE 1

*Relative radiosensitivities of amino acids in aqueous solutions**

AMINO ACID	SPECIFIC INACTIVATION DOSE D_0/C
dl-phenylalanine	1.18×10^9 rep./gm./ml.
l-histidine	1.25×10^9 rep./gm./ml.
l-cystine	2.40×10^9 rep./gm./ml.
l-tyrosine	2.60×10^9 rep./gm./ml.
l-leucine	3.60×10^9 rep./gm./ml.
dl-tryptophan	10.00×10^9 rep./gm./ml.

* From Bhatia (3).

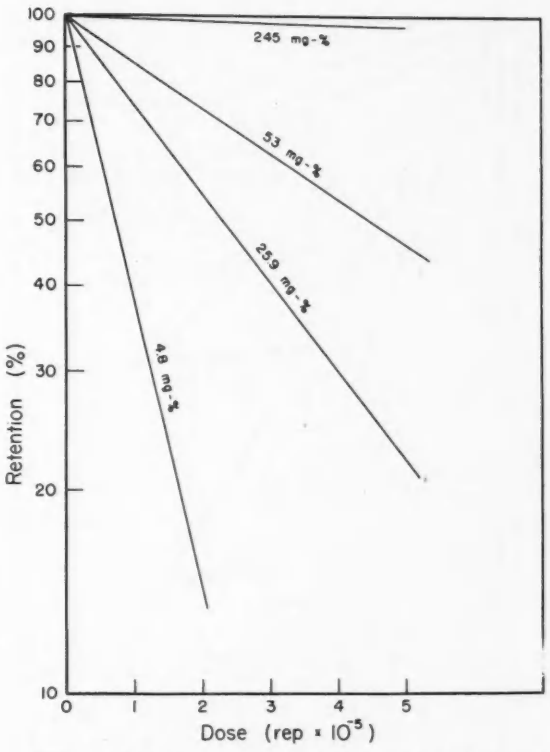

FIG. 2. *The effect of high-energy cathode rays on aqueous solutions of ascorbic acid at various concentrations (2, 5).*

The Temperature Effect. If radiations exert their effect on solutes indirectly via free radicals produced in the solution, one should be able to obviate this effect by immobilizing the free radicals by sufficiently reducing the temperature of the material to be irradiated to the frozen state. Thus, in the solid state, the diffusion rate of the free radicals is lowered. Such actually is found to occur (*Fig.* 4).

The Protection Effect. If a mixture of solutes is irradiated, the net effect on each solute will be different in comparison with results obtained on the irradiation of each solute alone. This fact is illustrated in Table 3. Niacin, when irradiated alone, is

TABLE 2

*Relative radiosensitivities of vitamins in aqueous solution**

VITAMIN	SPECIFIC INACTIVATION DOSE D_0/C
Vitamin B_{12}	7.65×10^8 rep./gm./ml.
Ascorbic acid	$1.19\text{–}3.6 \times 10^9$ rep./gm./ml.
Riboflavin	$2.6\text{–}5.2 \times 10^9$ rep./gm./ml.
Niacin	$2.73\text{–}4.07 \times 10^{10}$ rep./gm./ml.

* From Proctor and Goldblith (4).

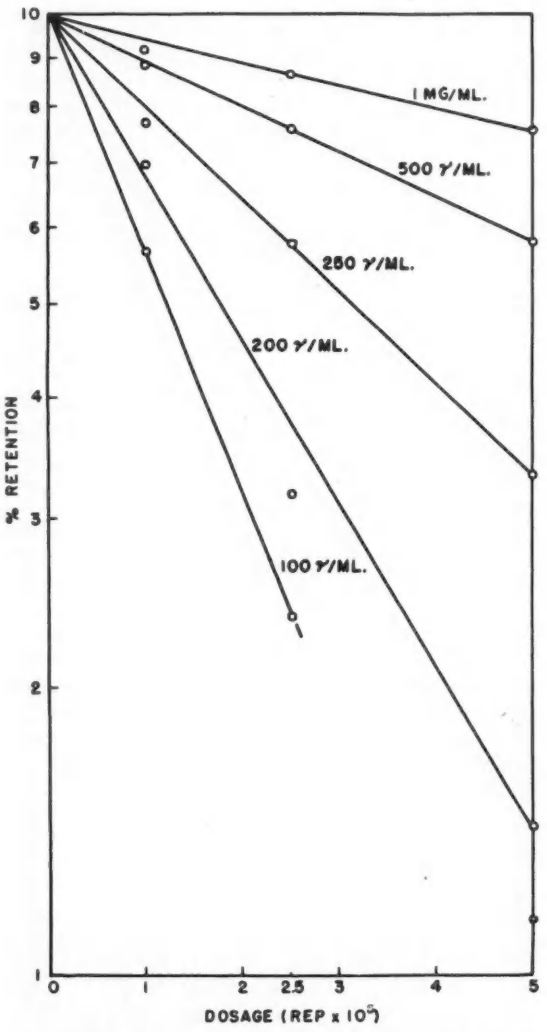

FIG. 3. *The effect of high-energy cathode rays on aqueous solutions of dl-phenylalanine at various concentrations (3).*

radioresistant; ascorbic acid, under the same conditions, is radiosensitive. When these two compounds are mixed and irradiated, the niacin is preferentially destroyed, i.e., it "protects" the ascorbic acid. Similar results are presented in Figure 5, wherein the amino acid, histidine, is protected by sodium d-isoascorbate. Thus, there is a competition by the solutes for the free radicals.

It is conceivable that as the number of solutes increases, as in a food, there would be a greater and more complex interaction and competition for the free radicals, with each solute, in general, showing less destruction. This is illustrated in data from various publications with ascorbic acid and riboflavin irradiated in pure solution and in evaporated milk (Table 4). It is to be noted that, in the food material, the energy required to inactivate 63 per

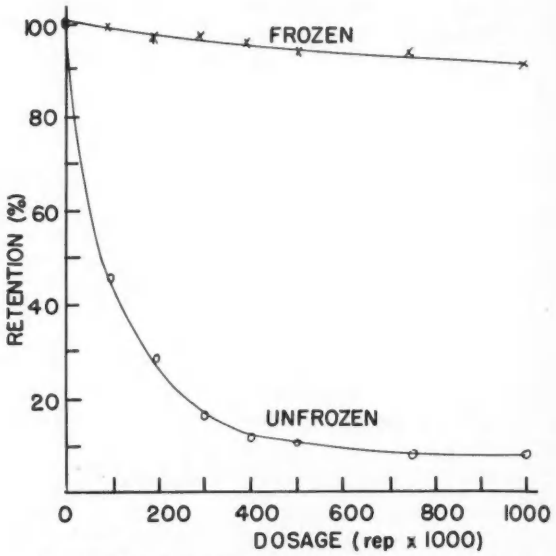

FIG. 4. *The effect of high-energy cathode rays on frozen and non-frozen solutions of ascorbic acid (5).*

cent of the ascorbic acid is approximately ten times that required to inactivate a like quantity of ascorbic acid in pure solution, and that approximately one hundred times as much energy is required to inactivate 63 per cent of the riboflavin in milk as compared with a pure solution of riboflavin. Thus, nutrients *in foods* are "protected" from ionizing radiations to a very marked degree.

This statement is further illustrated graphically by Figure 6, showing the irradiation of ascorbic acid *in vitro* and *in situ* in orange juice, both regular and concentrated. Figure 6 also illustrates the "dilution effect" in addition to the "protection effect," as well as the fact that, in natural food materials, nutrients are affected much less than *in vitro* in dilute solution. In some instances, the net effect on each may be very small and is within the limits of accuracy of the particular test methods. This is shown in Table 5, wherein measurements have been made of the amino acid content of haddock fillets treated with approximately twice the quantity of ionizing energy required for sterilization.

Enzyme systems react to radiations in a manner similar to other chemical compounds. These systems obey the indirect action theory. Thus, *in situ* in foods, enzymes are radioresistant, and means other than ionizing radiations, such as a quick blanch by radar energy, would be needed for their inactivation.

Side Reactions

The effects of ionizing radiations on the components of foods, other than the bactericidal effects, are collectively known as "side effects" or "side reactions." Included among these are the destruction of nutrients and changes in color, flavor, and texture of the foods.

TABLE 3

*Effect of high voltage X-rays on solutions of U.S.P. niacin, U.S.P. ascorbic acid, and on mixtures of the two, using dose of 125,000 r**

SOLUTION	CONCENTRATION BEFORE IRRADIATION		RETENTION AFTER IRRADIATION	
	Niacin	Ascorbic Acid	Niacin	Ascorbic Acid
	(γ/ml.)	(γ/ml.)	%	%
Niacin	50	—	86.0	—
Ascorbic acid	—	500	—	66.6
Niacin-ascorbic acid mixture	50	500	44.0	83.6

* From Proctor and Goldblith (6).

The side reactions involving nutrients in irradiated foods indicate little loss in certain instances and measurable losses in others. However, it is well known that the same chemical reactions which are responsible for these changes may also affect the flavor, color, and texture of irradiated foods. The extent of this effect, for a given dose, quantitatively varies from food to food. The threshold dose also varies for different foods. However, at dosage levels at which conventional objective physico-chemical tests of irradiated foods indicate no quantitative changes in nutrient values, the human palate is able to detect subtle changes in flavor.

These undesirable side effects of the radiation treatment of foods create the most important single problem to be overcome before commercial feasibility is achieved. Technologic and fundamental studies have indicated three possible approaches to obviating these undesirable side reactions:

(a) Irradiation in the frozen state.
(b) Irradiation in inert atmospheres.
(c) Addition of free-radical acceptors.

The rationale of each approach becomes obvious if one considers the three characteristics of the "indirect action" theory discussed above. Irradiation in the frozen state is based on greatly reducing the rate of diffusion of the free radicals produced by the radiations; irradiation in inert atmospheres is based on reducing the number of oxidative free radicals by removal of oxygen necessary for their formation; the addition of free-radical acceptors has been illustrated previously and is based on the fact that good free-radical acceptors will have a greater affinity for the free radicals than the compounds being protected. Each of these approaches, as well as combinations thereof, has been found to be efficacious. The universal solution for all foods has not yet been found, but research towards this end is actively under way in a number of laboratories.

It is conceivable that the subtle changes alluded to in the previous paragraphs in this section might also consist of molecular rearrangements in certain radiosensitive molecules and that this rearrangement might possibly affect the safety of the food. However, there has been no evidence to date that such is the case. The animal feeding tests conducted thus far indicate that no materials of a toxic nature are produced in irradiated foods. Further studies on chronic toxicity are required, however, before final approval may be given to the process by governmental regulatory agencies. Such studies on certain products are now being conducted in several laboratories.

TABLE 4

Specific inactivation doses of ascorbic acid and riboflavin irradiated per se *and in evaporated milk*

IRRADIATED MEDIUM	SPECIFIC INACTIVATION DOSE
	(D_0/C (r/gm./ml.)
Ascorbic acid-pure solution*	1.19×10^9–3.6×10^9
Ascorbic acid-evaporated milk†	2.4×10^{10}
Riboflavin-pure solution*	2.6×10^9–5.2×10^9
Riboflavin-evaporated milk†	3.7×10^{11}

* From Proctor and Goldblith, (4).
† From Kung, Gaden, and King (8).

TABLE 5

*Effect of cathode rays (dose 5,700,000 r) on amino acids in haddock fillets**

AMINO ACID	CHANGE IN AMINO ACID	
	Loss	Gain
	%	%
Phenylalanine	6.10	0.00
Tryptophan	6.92	0.00
Methionine	4.68	0.00
Cystine	0.00	0.00
Valine	0.00	6.36
Leucine	0.00	2.74
Histidine	0.00	8.11
Arginine	0.00	4.12
Lysine	4.23	0.00
Threonine	5.95	0.00

* From Proctor and Bhatia (9).

Applications of Ionizing Energy to Foods

Today there are a number of interesting applications of ionizing energy in the food field which appear to offer great potentialities.

Surface Sterilization of Foods. The shelf life of a number of food materials, such as frankfurters, is lessened due to bacterial or mold growth on the surface of the foodstuff. Sterilization of the surfaces of such foods may be accomplished by relatively low-voltage cathode rays and may, indeed, increase their shelf life. Encouraging results have been obtained in our laboratories with certain meat products, and these results offer great promise.

"Pasteurization" of Meats. Recent work has shown that it is possible to increase the shelf life of comminuted fresh meats by exposure to sub-lethal radiation doses—that is, quantities of radiation insufficient to insure complete sterilization but of enough intensity to greatly reduce the bacterial

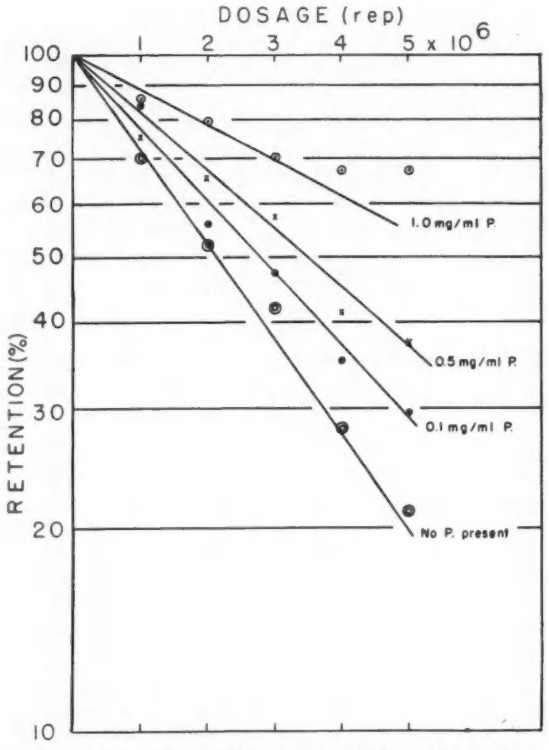

FIG. 5. *The effect of high-energy cathode rays on aqueous solutions of histidine·HCl (1.0 mg./ml.) in the presence of varying concentrations of d-isoascorbic acid (7).*

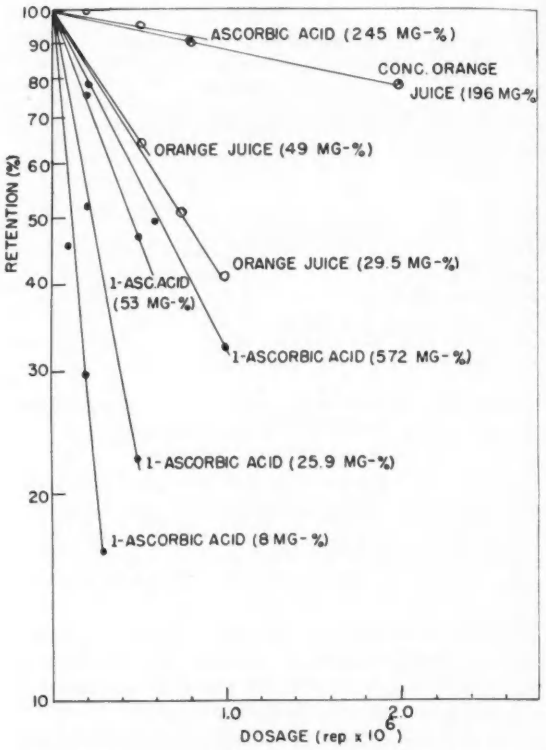

FIG. 6. *Summary of effects of high-energy cathode rays on ascorbic acid* in vitro *and* in situ *(4).*

content of the comminuted meats. By the addition of free-radical acceptors, it has been possible to apply sufficient radiation energy to keep comminuted fresh meats in the refrigerator at 40° to 45°F. without significant increases in bacterial count and without detectable flavor changes. This work points out many other possible synergistic applications of radiation and refrigeration which will increase the storage life of food products.

Destruction of Insects in Grain and Other Cereal Products. In this country, damage by insects to grain and grain products amounts to many millions of dollars annually. Recent extensive studies (10) have indicated the feasibility of using relatively low doses of ionizing radiations for the complete destruction of all metamorphic forms of insects responsible for this damage. No organoleptic differences have been detectable at the dosage levels required, and conservative cost estimates indicate that the process might well be within economic feasibility.

Inhibition of Sprouting of Tubers. Recent studies by Sparrow and Christensen (11) indicate that the storage of potatoes may be greatly improved by exposure to relatively low doses of radiation. Potatoes exposed to 20,000 r were kept in storage for eight months and longer without sprouting and without softening. The potentialities of applying this treatment to other tubers, such as onions, is indeed intriguing and points to a great utilization of radiations in the food industry.

Conclusion

This story of radiation sterilization has necessarily been an abbreviated one. In addition to several applications in the food field, which were used as illustrations, radiation sterilization offers numerous potentialities in the pharmaceutical field and in medicine.

It is hoped, however, that sufficient highlights in the food field have been covered to arouse new interest and new ideas, thus leading to a more rapid solution of the unsolved problems and the early commercial application of this relatively young and new branch of food preservation.

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BIOGRAPHICAL NOTES FROM THE HISTORY OF NUTRITION

Stanley Rossiter Benedict—March 17, 1884–December 21, 1936

Benedict's solution is familiar to all students who have taken a beginning course in biochemistry and made tests for the presence of glucose in urine. The man for whom the test is named was one who, along with Folin, opened up a new era in biologic chemistry.

Stanley Rossiter Benedict was born March 17, 1884, in Cincinnati where his father, Wayland Richardson Benedict, was Professor of Philosophy and Psychology at the University. His mother was a teacher and writer, and he was next to the youngest of six children. He grew up in an atmosphere of discussion and intellectual inquiry where the family gathered in the evening while the father read aloud. He obtained his bachelor's degree from the University of Cincinnati in 1906, where one of his teachers was Dr. J. F. Snell, who had worked with Atwater. This may have influenced young Benedict to go to Yale, where he came under the influence of Chittenden and Mendel. After obtaining his Ph.D. (1908) under Mendel, he was appointed Instructor in Chemistry at Syracuse University, and the following year became Associate in Biological Chemistry at Columbia University. In 1910, he went to the Medical College of Cornell University and in 1913 was appointed Professor of Chemistry. Although his appointment was in chemistry, all of his research was in physiologic chemistry.

Benedict was a prolific worker and during his life time was author or co-author of some ninety-four papers. His first (1909) was on the estimation of urea. He made notable contributions on creatine and creatinine metabolism (1914) and carbohydrate metabolism (1918–19). Folin was outstanding for the methods of analysis he developed for the determination of urea and nitrogen products in blood and urine; Benedict refined and improved these methods and those for glucose, thus making it possible to study intermediary metabolism of protein and carbohydrate. He discovered the presence of a sulphur-containing compound in blood (1925) which he at first called "thiasine" and later identified as ergothioneine. Another discovery of considerable interest was that the adult mammal can synthesize the purine nucleus; work with Dalmatian dogs showed that they differed from other breeds in that they excreted uric acid instead of the usual end product, allantoin.

Dr. Benedict was for several years Secretary of the American Society of Biological Chemists and served two terms as President of that Society. He was on the editorial board and was a Director of the *Journal of Biological Chemistry*, and from 1912 until his death in 1936, he supervised the Biological Chemistry Section of *Chemical Abstracts*.

In 1914, Dr. Benedict married Ruth Fulton, a distinguished anthropologist. He was a reserved man, retiring socially, but a very human and gracious person to those who knew him well. He had a quick temper which he often regretted; nevertheless, he was well liked by his students and fellow workers to whom he was always an inspiration. He had a clear and logical mind and was scrupulously fair. He read literature and poetry, but philosophy and philosophical speculation fascinated him. His favorite hobbies were engines, which he loved to set up and take apart, and photography—the chemical processes in developing and printing having special appeal to him.

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Nutritive Values and Flavor in Frozen Meat—A Review[1]

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WHEN the average person sees thawing meat standing in a pool of its own juices, he must wonder what has been lost from the meat tissues in this blood-like fluid or drip which has exuded from the meat. Is there not an economic loss in that fewer cooked portions will be obtained? Is there not a loss of vitamins, minerals, proteins, and other nutrients which are soluble in this aqueous drip solution? And what of flavor? It has long been assumed in vegetable cookery that the most nutritious vegetable is also the most flavorful. If this relationship holds true for meat, and if nutrients and other components are lost in the drip, then should not meat thawed before cooking be less flavorful than meat defrosted during cooking? Certainly, soluble flavor esters must be lost, but are they lost in sufficient quantity to make a flavor difference? A search through the literature indicates that answers to these questions are lacking for the most part.

REASONS FOR DRIP

The reason meat drips while thawing has been explained variously. Hiner, Madsen, and Hankins (1) reported that the quantity of drip obtained during thawing decreased with the decrease in temperature at which the meat was frozen. They found that larger ice crystals are formed in slow freezing than in rapid freezing and that more crystals appear between the muscle fibers in slow freezing; also, the water for this crystallization between fibers came from within the muscle fibers, leaving the fibers in a semidehydrated condition. Nichols and Mackintosh (2) found that both intra- and inter-cellular ice crystal formation contributed to the fragmentation of muscle fibers, and, as the number of these broken fibers increased, drip increased. Morgan concluded (3) that in slow freezing, muscle globin loses some of its power to hold water, probably because it undergoes a form of denaturation by the action of the concentrated salt solution in the partly frozen muscle. A study by Ramsbottom and Koonz indicated (4) that freezing temperatures are not a factor in the quantity of drip if the cut surface is small in relation to the volume of meat; but, if the cut surface is large in relation to the volume, then the lower the freezing temperature, the less will be the drip loss. Empey (5) and Sair and Cook (6) reported that drip is a function of hydrogen-ion concentration, while in another study Ramsbottom and Koonz (7) found that drip during thawing decreases as time between slaughter and freezing increases. They found only a slight change in *p*H after the first day of slaughter. On the other hand, Pearson and Miller have presented data (8) in support of the theory that the quantity of drip is not influenced so much by the rate of freezing as it is by the time the meat is in frozen storage.

The quantity of drip lost in thawing legs of pork has been reported by Noble and Hardy (9) to be approximately 1 per cent. Drip losses varying from approximately 2 to 6 per cent have been recorded in other studies (1, 4). The writer has obtained losses as high as 12 per cent in beef used by the armed forces. However, this meat had been in storage for a long time under conditions which were not always constant, being those encountered in military operations. In a study made in a hospital (10), the writer recorded on two occasions drip losses of 20 per cent for calves' liver; this study also indicated that drip losses in glandular meats were higher than those in muscle meats.

Boned roasts studied by Lowe *et al.* (11) lost three times as much weight by drip as similar non-boned roasts; it was their opinion that boning increased the cut surface of the muscles and thus

[1] This paper is an excerpt from a dissertation written in partial fulfillment of the requirements for the degree of Doctor of Philosophy, Columbia University. This research was supported by a grant from *House Beautiful* magazine. Received for publication June 1, 1954.

caused the greater loss. In this same study, where different cuts of beef, veal, lamb, and pork were used, drip losses ranged from zero for pork patties to slightly over 8 per cent for outer round beef roast. It might be well to note, however, that these percentages were for losses obtained only up to the time the interior of the meat reached 4°C. They do not reflect additional drip if meat is held for an extended period prior to cooking. Losses by drip occur not only in thawing; a considerable quantity of drip can be lost between the time of complete thawing and cooking if the period between the two is long. Although the data in the study by Lowe *et al.* were not analyzed for statistical significance, a cursory examination shows that the differences in the quantity of drip obtained from beef, veal, lamb, and pork—the greatest-to-least drip loss being in the order given—are perhaps significant. It also appears that significantly less press fluid would be found in meat which was allowed to thaw before being cooked than in meat defrosted during cooking.

Only two studies have appeared dealing with the nutrient value of drip itself. Pearson *et al.* conducted an experiment (12) in which paired steaks were aged for five days and then frozen. Later, one steak from each pair was thawed at 26°C., and the drip obtained in thawing was analyzed for a number of the B-complex vitamins. At the same time, the remaining paired mates were analyzed from the frozen state for the same vitamins. The results indicated that approximately 10 per cent of these vitamins were lost by drip, with the exception of pantothenic acid which had about a 30 per cent loss. Cook *et al.* found (13) that the drip of thawing beef contained about 9 per cent protein.

EFFECTS OF FREEZING AND STORAGE ON NUTRIENTS

Little information is available on the effect of freezing on nutrients in meat. Lehrer *et al.* (14) found that pork chops lost significant quantities of riboflavin, but not of thiamine or niacin; they likewise reported that, in another study (15), lamb chops lost significant amounts of thiamine on freezing, but that niacin increased slightly.

Fresh pork hams studied by Schweigert *et al.* (16) after fourteen days' storage at 4°C. retained 92 per cent of their original thiamine and niacin and 85 per cent of their original riboflavin. Lehrer *et al.* (14) reported a 21 per cent loss of thiamine in pork chops after three months' frozen storage and an additional 19 per cent in the next three months; there was a 31 per cent loss of riboflavin in the first three months, but none in a succeeding three-month period. Only an insignificant drop in niacin was noted after six months' storage. In a similar study on lamb chops, the same workers obtained (15) a significant loss of riboflavin during six months' frozen storage and an increase in niacin. No loss was noted for thiamine.

From these data, one would expect that the nutrient values of frozen meat, in some instances, would be less than those of fresh meat. However, the few values reported in the literature for frozen meat do not indicate much difference between the two.

NUTRIENT CHANGES IN COOKING

Some data are available on the nutritive value of frozen meat which has been cooked. Lamb chops cooked after thawing contained significantly more niacin than those defrosted during cooking (15), but there was no significant difference in the thiamine and riboflavin content (14). These authors saved 19 per cent of the thiamine and 14 per cent of the riboflavin by cooking pork chops from the frozen state; there was a slight increase in the niacin content when pork chops were cooked from a frozen state (14, 15). Westerman *et al.*, in studying thawing differences, found (17) that round steaks of beef, thawed in a refrigerator and then braised, retained approximately 35 to 69 per cent of their thiamine and 46 to 93 per cent of their niacin; comparable figures for parallel steaks thawed at room temperature were 36 to 62 per cent for thiamine and approximately 60 to 86 per cent for niacin; both sets of steaks—those thawed in a refrigerator and braised and those thawed in a room and braised—contained from 85 to 271 and 81 to 205 per cent, respectively, of their riboflavin. Increases in riboflavin in beef during cooking, although it was not previously frozen, have also been reported by Hinman and coworkers (18). Hartzler, Ross, and Willet (19) have also obtained increases in riboflavin in cooking pork.

FLAVOR DIFFERENCES

For the most part, investigators agree that thawing meat either before cooking or during cooking makes little difference in final flavor. According to Causey *et al.* (20, 21), who studied the effect of thawing methods on the palatability of ground pork, beef, and lamb, found pork and lamb patties thawed during cooking were "more frequently preferred" over pre-thawed patties, while there was no difference in the flavor of beef patties as a result of various methods of thawing. Noble states in a letter to the writer (22) that, on the basis of her work with family-size pieces of frozen meat, she "would agree with recent publications that thawing at refrigerator temperature, at room temperature, or during the first part of cooking gives an equally palatable meat." She also commented that she had "not tested thawing in water." The Home Economics Division of the Research Laboratories of Swift & Company has conducted a number of investiga-

tions to ascertain the effect of thawing methods on flavor. These workers have reported (23) that: "For more than seven years we have run tests on frozen and defrosted cuts of meat in the test kitchen. We have broiled, roasted, braised, and water-cooked these meats. Our experience has been varied... In general, we have found that with well-controlled cooking procedures, frozen meat may be cooked either with or without thawing. In one series of tests, steaks were broiled frozen, defrosted in the refrigerator, and defrosted in the kitchen. Judged by an experienced panel of tasters, no appreciable differences in eating quality were observed."

In another publication several years later, this laboratory reported (24): "The palatability scores of the cooked meat indicated that the method of thawing, i.e., during cooking, in the refrigerator, and in the kitchen, had little or no effect on the eating quality, i.e., flavor or juiciness of the meat. In other words, the judges said, 'No difference,' to the question, 'Which is better, to start cooking from frozen or the thawed state?' "

Kalen and co-workers (25) cooked paired chuck pot roasts thawed by two methods: one of the pair was defrosted at room temperature overnight and the other was defrosted during cooking. They found no differences in palatability which could be attributed to the defrosting methods. Lowe *et al.* (11), using a number of beef, veal, and pork cuts, concluded that "defrosting prior to cooking versus defrosting during cooking produced few differences in the palatability scores."

It must be recognized that all of these investigations on the difference in flavor which may arise by cooking from the frozen or the thawed state were conducted with a view toward predicting a difference detectable at a consumer level. It is not evident from any of these studies that any attempt has been made to ascertain at a laboratory level whether even small differences may exist when meat is cooked from the frozen state versus a meat that is cooked from the thawed state.

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Food-Borne Disease—A Continuing Problem[1]

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FOOD poisoning is an ever attendant problem, whether one is responsible for food preparation for two or two thousand, and the knowledge of how to deal with this recurring danger is the duty of all who are involved in food service. In institutional meal management, the administrator must not only be aware of control measures but must transmit to her employees an understanding of and a willingness to follow procedures which lead to the production of high quality food, as measured in standards of bacteriology. This infers that conditions must be so provided that the employees have opportunity to follow the best sanitary practices.

ORGANISMS CAUSING ILLNESS

Over the years, research and public health aboratories have reported many different bacteria being implicated as causes of food-borne illness for man. In this paper, however, emphasis will be given to only two genera of bacteria. These are chosen because they represent particularly pertinent problems at this time.

One of these two types of food poisoning which is currently of great concern is most frequently referred to in the literature as Staphylococcus food poisoning. There is some awkwardness in nomenclature, however. The illness obviously gets its name from an organism which was earlier known to bacteriologists as *Staphylococcus aureus*. More recently the taxonomists have reclassified the same organism with the Micrococci. In the genus Micrococci are many organisms which are common to our daily environment. Not all of them produce illness in man. Bacteriologists are still trying to find tests which will easily differentiate the food-poisoning organisms from the non-food poisoners. The food-poisoning members of the Micrococci produce illness in man by forming a toxin, which, when ingested, causes an irritation of the digestive system.

The second group or genus of bacteria to be included for discussion here is the Salmonella, because of its relevance to today's food-poisoning problems. Like the Micrococci, only certain members of the genus seem to offer serious problems as food-poisoning agents. Unlike the Micrococci, the Salmonella themselves enter the body to produce the illness. The symptoms of nausea, vomiting, and diarrhea are almost identical with those of Staphylococcus food poisoning, but there is some difference in the time interval in which the symptoms appear after ingestion of the peccant food. For Staphylococcus food poisoning, 2½ to 3 hr. is a usual time span, whereas for Salmonella, as long as 7 to 72 hr. is more typical.

THE PROBLEM OF INFECTION

For many conscientious dietitians, the question arises as to how these food-poisoning organisms get into food. First, let us consider the food itself. Few foods come to the kitchen sterile, in spite of food processing of high standards. Bacteria are present, varying in number and type, on or in most items of diet. The size of the bacterial load even in food of the same kind may vary greatly. In some recent experiments, we undertook to examine the total bacterial and Micrococci counts of some ham loaf mixtures. (1)

From this work, it appeared that there was a great difference in the number of viable bacterial cells present in the ham loaf mixtures, according to the source of the meat. The ham loaf mixtures which were prepared, using the meat of one packer, showed a total bacterial count of approximately 292,800 cells per gram of uncooked mixture, with about 132,650 of these cells being Micrococci. When the meat of a second packer was similarly prepared and examined, the total bacterial count appeared to be about 9,300 cells per gram of mixture of which approximately 790 were Micrococci. Thus, the total number of

[1] Presented at the 37th Annual Meeting of The American Dietetic Association in Philadelphia, on October 27, 1954.

viable bacterial cells in seemingly similar foods may be in very different magnitudes. Destruction of bacteria by heat depends in part on the size of the cell load. Since one cannot know with certainty the kind or number of bacterial cells in a food, it must be handled in such a way as to take into account all possible degrees of infection.

Aside from the food itself, the human element can and most frequently does play a primary role in the food-poisoning problem. The unclean hands of workers may carry Micrococci or Salmonella into the food. Sneezing or coughing over the food is an equally dangerous practice. The kitchen supervisor must be ever alert to maintaining the highest standards of food handling among employees.

CONTROL OF INFECTION

Since it is granted that the food may harbor or become infected with one or more types of food-poisoning organisms, a means of proper control is essential, if epidemics of this type are to be prevented.

The question immediately arises as to the effect of cookery. Commenting first on the ham loaf mixtures referred to above, it was found that some Micrococci did survive when the loaves were cooked to an internal temperature of 80°C. Other studies, also, have shown that the Micrococci are moderately heat resistant. The literature indicates that in certain products, particularly egg dishes, the Salmonella are destroyed by somewhat lesser degrees of heating. For example, Winter *et al.* (2), Solowey, Sutton, and Calesnick (3), Schneider (4), and Ayres and Slosberg (5) all reported apparent destruction of viable Salmonella cells in various egg substrates in 6 min. or less at temperatures varying from 58.9°C. to 61.8°C. In our own experience, we have found that a selected strain of Salmonella survived in chicken muscle to somewhat higher temperatures, namely 90°C. Our experiments were made under what might be regarded as unnatural conditions, however, since the cell load was very high (6).

Telling experiments dealing with this point were those of Castellani *et al.* (7). They introduced cells of *Staphylococcus aureus* (Micrococci) and *Salmonella pullorum* along with *Streptococcus faecalis* into the stuffing of turkey before roasting. They found that a temperature of 160°F. (71°C.) must be achieved in the center of the stuffing before the bird is removed from the oven to assure adequate destruction of the organisms. It was of interest that during a part of the roasting period, the bacteria were actually multiplying in the stuffing. The experiments further revealed that the rate of heat penetration for a larger bird is slower than for a smaller bird. Slightly longer roasting periods were necessary as the amount of dressing increased. Added roasting time was required if the bird and stuffing were at refrigerator temperature. The roasting time found to be adequate for making a frozen stuffed bird safe was about twice as great as that required for birds which were initially at room temperature. A procedure in which the bird was partially roasted and finished at a later time was particularly unsound.

In their studies, Kintner and Mangel (8) observed evidences of the survival of both Staphylococci (Micrococci) and Salmonella in cornstarch puddings which had been heated to 78° to 86°C.

These and other studies indicate that cooking may not free foods from dangerous food-poisoning organisms. All of the evidence thus far cited concerns the viable bacterial cells. Some consideration must also be given to the toxin formed by the Micrococci, since for this genus it is the ingestion of the toxin and not the cells *per se* which is harmful. In general, over the years this toxin has come to be looked upon as relatively heat stable. Evidence has been submitted to the effect that the toxin withstands boiling for as long as 60 min. (9). More recently a somewhat contradictory viewpoint has been presented (10). In examining this evidence, however, it is noted that the pork butts, which served as a vehicle for the enterotoxin, were subjected to prolonged heating (2 hr. 40 min.) in lard at a very high temperature (500°F). While the toxin appeared to be destroyed by such treatment, the palatability of meat so prepared is open to question.

In summary, it would appear that temperatures except those at or near the boiling point of water frequently do not destroy the viable cells of either the Micrococci or the Salmonella. The toxin of the Micrococci creates an additional hazard, which must be considered. Food held at temperatures representing moderate degrees of warmth may actually make possible multiplication of the aforementioned organisms.

LOW TEMPERATURES TO CONTROL BACTERIA

The use of low temperatures has long been recognized as a means of control of bacterial growth. The earlier studies of Black and Lewis (11) indicated that from a bacteriologic standpoint, food which is to be stored is best placed in the refrigerator not longer than ½ hr. after removal from the stove. Their results were based on studies of ham, chicken, broth, and custard prepared and stored under hospital conditions. They found no adverse effects in refrigerating hot food immediately. More recent studies from the same laboratories (12) have emphasized the importance of placing large quantities of food in small units for refrigeration if maximum benefit is to accrue. For example, using chicken salad (12), they found it took 9 hr. in the refrigerator for a 100-serving batch in a deep pan to reach a temperature of 50°F., whereas a 25-serving batch in a shallow bowl took 3 hr. under similar conditions. Bacterial growth is much slowed at 50°F. or less. Refrigeration is certainly one of our most potent means of controlling bacterial growth, but one

should not be lulled into a false sense of security by this fact. If refrigeration is to be effective, every effort must be made to bring all of the mass of the food to 50°F. or less in the shortest possible time. Consideration must be given to the size of container and particularly the depth of the food in the container, the temperature of the food at the time of storage, and the cooling power of the refrigerator. Food in shallow layers in a not-overcrowded refrigerator is essential for the safety of those who are to eat it. In passing, it should be noted that the toxin of the Micrococci has been found to be stable to refrigeration for as long as fourteen months (13).

Moreover, it has been found that both Micrococci and Salmonella survived frozen storage for six months. When inoculated, frozen products were removed from the freezer at the end of this time and transferred to an incubator at 30°C., the growth response of the organisms was immediate and vigorous. It was further observed that when infected frozen products were placed in a refrigerator, pathogenic bacterial reproduction was initiated within a few days (14).

The food poisoning problem remains an ever present one. Basic knowledge and constant vigilance appear to be the only solution.

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Relation of Protein and Calories in Pregnancy

"Many an expectant mother may be cutting her calories too close in order to keep from gaining too much weight during pregnancy," warned Dr. Helen Oldham of the Human Nutrition Research Branch, U. S. Department of Agriculture, when speaking before the Weight Control Colloquium at Iowa State College on January 19.

Dr. Oldham explained that the kind and amount of protein a woman eats are highly important both to her own health and to the development of her unborn child. Research at the University of Chicago with women in the last five months of pregnancy indicated strongly that when calories are low, the individual tends to burn protein for energy purposes rather than using it for tissue building and maintenance.

Diets of women in this study were self-chosen and varied widely in both protein and caloric content. Some women on relatively high protein intakes were not storing nitrogen as expected, and others with relatively low protein intakes were not much worse off than those with fairly good protein intakes. A study of the caloric intake in these cases indicated that a woman who actually ate less protein but who had at least 1950 calories in her diet retained twice as much nitrogen for body use as women who ate more protein but less than 1950 calories. Thus, some women on restricted food intake may have been, in reality, losing body tissue although the scales registered weight gains.

"The question as to how many calories should be allowed to insure nitrogen retention by the mother in an amount equivalent to that needed for herself and her unborn child, and at the same time to prevent excessive weight gains is not a simple one," Dr. Oldham said. "The conventional method of determining this by following weight changes leaves much to be desired. It is increasingly evident that the amount of water varies with the individual, and scales, of course, cannot distinguish between a pound of water and a pound of tissue."

Distribution of Nutrients among Meals and Snacks of Iowa School Children[1]

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IN THE study of food habits and nutrient consumption of children, little attention has been directed toward the distribution of the nutrients among meals and snacks. Recent research has indicated the importance of the so-called "time factor," which takes cognizance of the nutrient composition of the food mixture available for absorption at a given time (1) and the distribution of the nutrients during the day (2). Steele and others studied the percentage of nutrients furnished by breakfasts and snacks in the daily diets of children in the Northeastern Area (3). They observed that breakfasts contributed about one-fifth of the daily nutrient intake for both boys and girls and that between-meal foods contributed 10 per cent or less. There may indeed be no standard distribution of nutrients of the total daily nutrient intake, but information concerning the nutritive contributions of meals and snacks should be helpful in improving children's diets.

The present report consists of an analysis of the percentage distribution of the food energy value and nutrients in the daily diets of a state-wide sample of 1188 Iowa school children, and an analysis of the nutrient content of the meals and snacks classified according to their dietary adequacy. The sample of children, methods of obtaining dietary records, and methods of computing the nutritive value of diets have been described in detail elsewhere (4–6.) A summary of the number of subjects according to age and sex is presented in Table 1. The mean percentage distribution of nutrients among meals and snacks was computed from data obtained from seven-day dietary records for each child. The means, as computed for age-sex groups, are shown in Table 2. Because the differences between the mean percentages at successive ages were small, the data were grouped as follows for boys and girls separately: 6–7–8-year olds; 9–10–11-year olds; 12–13–14-year olds; and 15 years and above.

[1] Contribution No. 13, Sub-Project 2, "The Nutritional Status of School Children: The School Lunch as an Influencing Factor" of the North Central Region Cooperative Project NC-5, "Nutritional Status and Dietary Needs of Population Groups." (a) Human Nutrition Research Branch, Agricultural Research Service, U. S. Department of Agriculture, and (b) Iowa Agricultural Experiment Station, Ames. Journal Paper No. J-2558, Project 1021. Supported in part by a grant and other assistance from General Mills, Inc., as part of its nutrition education program. Received for publication October 1, 1954.

BREAKFASTS

This meal furnished 15 to 20 per cent of the caloric value of the daily diets for children of the different age-sex groups. For girls, the percentage of the day's calories obtained at breakfasts decreased from 20 at six, seven, and eight years to 15 per cent at fifteen years and older (Table 2). For boys at most ages breakfasts provided 20 per cent of the food energy value of the diet.

A slightly smaller proportion of the day's protein (14 to 20 per cent) was obtained at breakfasts. The distribution of children with reference to the percentage of the total protein consumption supplied by breakfasts is shown in Table 3. Most of the children had from 10 to 30 per cent of their protein at breakfast. Low-protein breakfasts occurred more frequently with children of twelve and older than with younger children. In two of the age-sex groups, approximately one-fifth had breakfasts which supplied less than 10 per cent of the day's protein.

Breakfasts furnished more of the day's calcium, riboflavin, and ascorbic acid than of the day's food energy, but less of the vitamin A and niacin. With the possible exception of ascorbic acid, girls of twelve and older obtained a smaller proportion of the daily intake of all nutrients at breakfast than did the younger girls.

According to these data, the nutrient quality of the breakfasts eaten by Iowa school children was not outstandingly poor. The calories obtained at breakfast were fairly well fortified with nutrients except vitamin A and niacin. However, breakfasts

TABLE 1

Distribution of children in sample by age and sex

SEX	6–8-YEAR OLDS	9–11 YEAR OLDS	12–14-YEAR OLDS	15 YEARS AND ABOVE
Boys	147	163	175	101
Girls	141	182	165	114
Total	288	345	340	215

did provide a relatively small proportion of the day's total calories (approximately only one-fifth). Whether Iowa children would benefit by a larger proportion of their day's food supply at breakfast poses a question in practical nutrition. On school days, most children have little opportunity for mid-morning snacks, and the small breakfasts may not suffice to sustain them comfortably until noon.

The gross evaluation of the breakfasts of these children according to foods used in this meal has been reported (5). Approximately one-half of the children did not have breakfasts which conformed to recommended plans for this meal. The present analysis indicates that the poor ratings may revolve somewhat around a low caloric intake at this meal. The favorable position of breakfasts particularly in relation to calcium does not necessarily mean that this meal was rich in this nutrient, since the total daily intake was low (6). The findings from the calculated diets and the gross evaluations are not necessarily in conflict. The results, however, do suggest the need of caution in interpreting the results of gross evaluations of meals.

The previous study of the breakfasts of Iowa school children revealed an infrequent use of eggs at breakfast. The greater use of eggs at this meal by many children would increase its contribution to the total caloric supply and particularly to vitamin A in which it was notably low.

LUNCHES AND DINNERS

Lunches afforded approximately one-third of the day's supply of food energy together with a proportionate amount of most nutrients. They furnished slightly more than this amount of the day's protein, vitamin A value, and niacin. For all the age-sex groups, lunches more nearly provided one-third of all the nutrients than did any other meal and in that sense might be considered the most nearly "balanced" of the three meals.

Forty-two per cent of the children of the study participated in the school lunch program. Of the 7224 lunches included in the analysis, no more than 30 per cent were provided by the school. The contributions of the school lunch may, therefore, not be apparent in these data. At least under existing conditions, the school lunches were not sufficiently rich in nutrients to make this meal conspicuous for its contribution of any specific nutrient.

TABLE 2

Mean percentage distribution of nutrients among meals and snacks

AGE GROUPS	PERCENTAGE OF TOTAL DAY'S INTAKE							
	Boys				Girls			
	Breakfast	Lunch	Dinner	Snacks	Breakfast	Lunch	Dinner	Snacks
	Calories							
yr.								
6–8	20	32	33	15	20	33	34	13
9–11	20	32	34	14	18	33	34	15
12–14	20	32	35	13	17	33	34	16
15+	17	33	33	17	15	34	35	16
	Protein							
6–8	19	35	37	9	20	36	36	8
9–11	19	35	37	9	18	36	37	9
12–14	19	35	38	8	16	36	37	11
15+	17	35	37	11	14	37	39	10
	Calcium							
6–8	27	32	30	11	26	33	31	9
9–11	26	33	32	9	26	34	30	10
12–14	27	32	30	11	25	32	31	12
15+	23	32	31	14	20	34	33	13
	Iron							
6–8	21	32	37	10	20	34	37	9
9–11	20	33	38	9	18	34	38	10
12–14	19	34	39	8	16	35	38	11
15+	19	33	37	11	14	37	39	10
	Vitamin A Value							
6–8	16	39	37	8	16	38	39	7
9–11	14	40	39	7	15	39	38	8
12–14	16	39	39	6	13	40	38	9
15+	15	37	40	8	14	43	35	8
	Ascorbic Acid							
6–8	28	28	30	14	25	32	29	14
9–11	24	31	31	14	23	32	30	15
12–14	21	34	34	11	21	34	32	13
15+	21	33	34	12	27	31	31	11
	Thiamine							
6–8	23	31	34	12	22	33	33	12
9–11	22	32	34	12	20	33	34	13
12–14	21	32	36	11	19	33	35	13
15+	17	33	35	15	16	35	36	13
	Riboflavin							
6–8	25	31	33	11	25	32	33	10
9–11	23	33	33	11	23	33	32	12
12–14	24	31	33	12	21	32	33	14
15+	20	32	33	15	17	34	35	14
	Niacin							
6–8	17	35	39	9	17	37	38	8
9–11	16	36	40	8	14	37	40	9
12–14	14	36	42	8	13	38	40	9
15+	12	36	41	11	11	39	42	8

Dinners provided one-third, or slightly more, of the calories of the daily diets. In proportion to the

TABLE 3

Percentage distribution of children with reference to percentage of protein provided by breakfast

AGE	PERCENTAGE OF SUBJECTS RECEIVING AT BREAKFAST							
	0–9% of total protein intake		10–19% of total protein intake		20–29% of total protein intake		30% and over of total protein intake	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
yr.								
6–8	3	2	51	52	44	43	2	3
9–11	5	6	53	61	39	32	3	1
12–14	22	8	42	68	32	21	4	3
15+	15	18	43	68	40	13	2	1

caloric value of dinners, this meal was high in vitamin A value, niacin, iron, and protein but low in ascorbic acid and calcium. Dinners tended to contain slightly more than lunches of calories, protein, iron, thiamine, and niacin but less of calcium. These comparisons suggest that an increased use of milk and of the ascorbic acid-rich foods would improve the nutritive balance of the dinners of these Iowa school children.

SNACKS

From 13 to 17 per cent of the total caloric value of the daily diets was provided by snacks. For girls, the proportion from snacks increased from 13 per cent at six to eight years of age to 16 per cent at twelve years and older. Boys of fifteen and older and girls of twelve and older obtained as many of their calories at snacks as at breakfasts. Snacks provided approximately 10 per cent of the day's protein and iron, slightly less than 10 per cent of the vitamin A value and niacin, and between 10 and 15 per cent of the calcium, ascorbic acid, thiamine, and riboflavin.

Relative to the calories, snacks furnished a high proportion of the total carbohydrate ingested during the day (20 per cent). This between-meal eating represented a considerable portion of the diet and consisted of foods with nutrient shortages, which must be compensated for in other meals if the children are to have good diets. Milk and ascorbic acid-rich fruits were not prominent among snacks. The average intake of milk in snacks for the children in all ages was less than ½ cup. Relative to the caloric value, food ingested as snacks was poorer in nutritive quality than that eaten at the meals. Efforts to improve the nutritive quality of the diets of Iowa school children should apparently first be directed toward the improvement of snacks. Research is needed to assess the effects of between-meal eating on the day's total intake of food and on the nutrition of children.

NUTRIENTS IN MEALS AND DIETARY INTAKE

Is the nutritive quality of school children's diets related to the distribution of caloric value and nutrients among meals and snacks? The diets of these Iowa school children have been previously classified into the following three classes: I, those which contained all nutrients in amounts not less than 100 per cent of the Recommended Dietary Allowances of the National Research Council (7); II, those in which some nutrients were present in amounts less than 100 per cent of the allowances, but none was less than 67 per cent; III, those which contained at least one nutrient in an amount less than 67 per cent of the allowances. The differences between the nutritive value of the diets of these three classifications have been discussed, together with the physical and biochemical measurements of the children of Classes I and III (8). The average percentage distribution of nutrients among meals and snacks was computed for diets of the three classifications for each of the four age-sex groups. Little difference in the distribution of nutrients was found except for ascorbic acid. Children of Class I had a larger proportion of their day's supply of this nutrient at breakfast than had those of Classes II and III. The percentage of ascorbic acid intake obtained at breakfasts decreased successively from Class I to Class III in all age-sex groups (Table 4).

TABLE 4

Percentage of ascorbic acid intake supplied by breakfast in diets of three classifications

AGE	PERCENTAGE OF ASCORBIC ACID FURNISHED BY BREAKFASTS					
	Class I		Class II		Class III	
	Boys	Girls	Boys	Girls	Boys	Girls
yr.						
6–8	37	29	25	25	17	21
9–11	33	27	24	26	16	17
12–14	26	34	22	22	18	16
15+	27	38	21	27	19	26

Diets which conformed to the allowances (Class I) included more of the daily intake of the ascorbic acid in the breakfasts than did those which failed to meet the allowances (Classes II and III). Children receiving a liberal supply of ascorbic acid at breakfasts were the ones who generally had good diets. In other respects, it appears that the children with diets which were fully adequate followed about the same plan of eating as the others so far as distribution of nutrients among meals and snacks was concerned. The analysis shows that the principal differences were in total caloric intake at each meal and possibly the nutritive value of snacks.

NUTRITIVE VALUE OF MEALS AND SNACKS IN CLASS I DIETS

The actual allowances of calories and nutrients in specific meals of children throughout the day may be of special interest to those responsible for planning single meals, such as the school lunch.

TABLE 5

Mean daily intake by children whose diets attained or exceeded the Recommended Dietary Allowances (Class I)

AGE	BOYS					GIRLS				
	Number	Breakfast	Lunch	Dinner	Snacks	Number	Breakfast	Lunch	Dinner	Snacks
					Food Energy Values					
yr.		*calories*	*calories*	*calories*	*calories*		*calories*	*calories*	*calories*	*calories*
6	17	458	764	793	381	11	485	653	646	369
7	22	476	773	820	318	13	468	748	730	266
8	23	518	789	922	321	13	447	745	808	316
9	20	562	912	970	317	11	452	829	864	459
10	9	593	949	1016	346	8	501	924	974	346
11	12	570	946	1008	426	6	540	948	1024	467
12	17	625	1166	1256	520	9	536	1039	1080	446
13+	21	670	978	1084	419	10	561	1094	1220	379
					Protein					
		gm.	*gm.*	*gm.*	*gm.*		*gm.*	*gm.*	*gm.*	*gm.*
6	17	14	26	27	8	11	15	24	24	6
7	22	15	26	27	6	13	15	25	26	5
8	23	23	27	32	6	13	14	26	29	5
9	20	17	31	34	6	11	14	28	28	10
10	9	17	32	36	6	8	14	28	31	6
11	12	18	34	37	7	6	15	35	37	8
12	17	19	40	41	11	9	16	35	38	8
13+	21	23	40	44	11	10	18	37	42	8
					Calcium					
		mg.	*mg.*	*mg.*	*mg.*		*mg.*	*mg.*	*mg.*	*mg.*
6	17	309	417	398	161	11	312	369	342	106
7	22	317	407	395	115	13	300	377	339	94
8	23	339	400	448	126	13	299	419	409	97
9	20	359	432	428	105	11	305	344	347	211
10	9	343	462	461	117	8	292	428	393	87
11	12	387	475	482	87	6	334	506	532	104
12	17	412	535	509	188	9	327	489	445	165
13+	21	458	534	569	185	10	325	466	497	136
					Ascorbic Acid					
		mg.	*mg.*	*mg.*	*mg.*		*mg.*	*mg.*	*mg.*	*mg.*
6	17	37	20	23	14	11	22	31	21	14
7	22	32	24	20	15	13	38	24	27	18
8	23	38	22	22	12	13	35	30	26	20
9	20	35	28	28	11	11	28	21	25	23
10	9	34	26	26	13	8	28	34	38	28
11	12	35	32	31	14	6	33	21	30	27
12	17	37	34	39	18	9	43	31	25	18
13+	21	39	46	44	22	10	45	34	39	15

The standards commonly used are based on an arbitrarily selected fraction of the recommended allowances. The present data afford an estimate of the nutritive value of the meals of children from a well-selected sample, whose diets attained or exceeded the recommended allowances. These figures are shown in Table 5 for calories, protein, calcium, and ascorbic acid. They may suggest appropriate nutrient allowances for meals of school children in daily diets designed to meet the recommended allowances. Although the number of children in a few age groups was small, in no case were data obtained from less than 54 daily records, and in a number of ages the cases were 140 or more.

MEALS AND SNACKS IN DIETS OF DIFFERENT LEVELS OF INTAKE

Mean daily nutritive value of the diets of Classes I and III has been reported (8). The differences between the meals of these two groups of boys and girls were also investigated for calories, protein, calcium, and ascorbic acid.

The mean caloric value of the diets of children of Class III was 20 to 40 per cent less than that of children of Class I for all age groups. The differences between the caloric values of the three meals of the two dietary groups were of this same general magnitude. The trends noted with calories were also evident in protein, calcium, and ascorbic acid. The differences between the diets of Classes III and I could not be traced to differences in any one of the three meals, but rather to low caloric meals generally poor in nutrients.

Contrary to expectations, the children with the poorest diets, as compared with those rated best, did not have an excessively large number of calories from snacks, except possibly in the case of the teen-age boys. However, the nutritive quality of the snacks of Class III was poor in comparison with that of Class I. For example, the twelve-year-old boys of Class III had snacks providing 34 per cent fewer calories than observed for Class I, but the protein, calcium, and ascorbic acid contents of their

snacks were 44, 48 and 55 per cent less. Girls of twelve in Class III had snacks 8 per cent lower than those of Class I in calories, but 12, 35, and 54 per cent lower in protein, calcium, and ascorbic acid.

This analysis, therefore, suggests two additional reasons for the differences in nutrient intakes of Classes I and III: first, a smaller total caloric and nutrient intake by Class III than by Class I at each of the three meals; and, second, snacks of poor nutritive quality for most of the age-sex groups.

SUMMARY

For Iowa school children, breakfasts furnished 15 to 20 per cent of the caloric value of the daily diets, lunches 32 to 34 per cent, dinners 33 to 35 per cent, and snacks 13 to 17 per cent. Variations within age-sex groups were slight. Older girls tended to have fewer calories at breakfast and more at snacks. The distribution of nutrients among meals was comparable to that of calories, though in proportion to food energy value, breakfasts tended to be low in vitamin A value and niacin, and dinners low in calcium and ascorbic acid. Few children had less than 10 per cent of their protein at breakfast, although in some of the older groups, one-fifth had breakfasts which contained less than 10 per cent of the protein intake for the day. The small proportion of calories and nutrients provided by breakfasts of these Iowa children is suggested as a problem needing further study. Snacks, which provided almost as many calories as breakfasts, were proportionately high in carbohydrate and low in all nutrients, except ascorbic acid for certain age groups.

The mean caloric, protein, calcium, and ascorbic acid intake at meals and snacks of children whose diets attained or exceeded the recommended allowances of the National Research Council was presented. The main differences observed between the diets at the two extremes of intake were first in intake of calories and nutrients in each of the three meals, second in the distribution of ascorbic acid in the meals, and third in the nutritive quality of snacks.

For these Iowa children, a liberal intake of food at all meals seemed to be the principal safeguard against diets of poor nutritive quality. There was little evidence that a careful selection of foods at specific meals contributed to the higher nutritive quality of the diets of Class I as opposed to Class III, with the possible exception of the use of ascorbic acid-rich foods at breakfasts. Furthermore, the findings indicate that the quality and quantity of snacks may play a critical role in determining the nutritive value of the diet.

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How Long Should Frozen Meat Be Stored?

A recent release from the Division of Home Economics, American Meat Institute, makes the following recommendations for storing frozen meat at a temperature of 0°F. (or below) in a home freezer, locker, or combination refrigerator-freezer.

Beef: 6 to 8 months
Fresh pork and veal: 3 to 4 months
Lamb: 6 to 7 months
Ground beef: 3 to 4 months
Fresh pork sausage: 2 to 3 weeks
Variety meats (liver, heart, tongue, and so on): 3 to 4 months
Smoked hams, picnics, and slab bacon (whole or half): not to exceed 60 days
Sliced bacon: do not freeze

(Cured and smoked meats deteriorate rapidly in flavor when frozen. For this reason, it is recommended that bacon be kept at refrigerator temperature and that larger cuts, such as hams, be stored in the freezer only for limited periods.)

Cooked meat: 2 to 3 months
Combination meat dishes (soups, stews, and so on): 1 month

Editorial

Report of the Nominating Committee, The American Dietetic Association, 1954-55[1]

The Nominating Committee of The American Dietetic Association—Louise Irwin, June Pettibone, Virginia Toews Stucky, Anna M. Tracy, and Louise Hatch, Chairman—presents the following ballot for 1955–56:

PRESIDENT-ELECT

Lucille M. Refshauge: B.S., University of Nebraska; M.S., Teachers College, Columbia University; dietetic internship, St. Marys Hospital, Rochester, Minn.

Positions held:
- Dietitian, Gallinger Hospital, Washington, D. C.
- Dietitian, Desert Sanatorium, Tucson, Ariz.
- Director, Dietary Department, Mt. Sinai Hospital, Philadelphia
- Educational Director, The American Dietetic Assn., Chicago
- Present position—Director of Dietetics, Hartford (Conn.) Hospital

Professional activities:
- Speaker of the House of Delegates, A.D.A.
- Member, Council of the House of Delegates, A.D.A.
- A.D.A. representative to Joint A.H.A. Commission on Care of the Patient
- Member, Placement Bureau Board, A.D.A.
- Chairman, Nominating Committee, A.D.A.
- Member, Membership Committee, A.D.A.
- Delegate, A.D.A.
- President, Connecticut Dietetic Assn.
- Member: Iota Sigma Pi, Kappa Delta Pi, Pi Lambda Theta

Publications
- Papers in this JOURNAL and other professional publications

SPEAKER-ELECT OF THE HOUSE OF DELEGATES

Adelia M. Beeuwkes: B.S., Michigan State College; M.S., University of Michigan; dietetic internship, University of Michigan Hospital, Ann Arbor

Positions held:
- Therapeutic Dietitian, University Hospital, Ann Arbor
- Therapeutic Dietitian, New York Hospital, New York City
- Therapeutic Dietitian, Presbyterian Hospital, New York City
- Nutritionist, University Health Service, Ann Arbor
- Instructor in Nutrition, Div. of Hygiene and Public Health, University of Michigan, Ann Arbor
- Instructor in Dietetics, University of Michigan Medical School
- Present position—Associate Professor of Public Health Nutrition, University of Michigan School of Public Health

Professional activities:
- Chairman, Community Nutrition Section, A.D.A.
- Member, Council of the House of Delegates, A.D.A.
- Chairman, Program Advisory Committee, A.D.A.
- Chairman, Journal Board, A.D.A.
- Member, Dietetic Internship Board, A.D.A.
- Member, History of Nutrition and Dietetics Committee, A.D.A.
- Delegate, A.D.A.
- President: Michigan and Ann Arbor Dietetic Assns.

Publications:
- Papers in this JOURNAL and other professional publications

Evelyn A. Carpenter: B.S. and M.S., Drexel Institute of Technology, Philadelphia

Positions held:
- Dietitian, West Philadelphia Hospital for Women
- Dietitian, Physicians and Surgeons Hospital, Wilmington, Del.
- Chief Dietitian, Philadelphia Hospital for Contagious Diseases
- Present position—Director, Dietary Department, North Division, Philadelphia General Hospital

Professional activities:
- Chairman, Local Convention Arrangements, 1947, 1954, A.D.A.
- Member, Council of the House of Delegates, A.D.A.
- Delegate, A.D.A.
- President: Pennsylvania and Philadelphia Dietetic Assns.
- Vice-President, Pennsylvania Dietetic Assn.
- Editor, Bulletin of the Pennsylvania Dietetic Assn.

Publications:
- Article in *Hospital Management*

TREASURER

Alta B. Atkinson: B.S., Montana State College; M.S., Teachers College, Columbia University

Positions held:
- Assistant in Commons, University of Washington, Seattle
- House Director, University of Michigan, Ann Arbor
- Manager, Michigan League, University of Michigan, Ann Arbor
- Administrative Dietitian, New York Hospital, New York City
- Manager of Food Service, Hunter College, New York City
- Present position—Manager of Food Service and Associate in Home Economics, Teachers College, Columbia University, New York City

Professional activities:
- Member, Council of House of Delegates, A.D.A.

[1] Other nominations may be made by nomination petitions signed by not less than 400 members of the Association, of whom not more than 30 shall be from any one state, assented to in writing by the person or persons named thereon as nominees, and filed with the Secretary at the office of the Association on or before April 15, 1955.

Chairman, Placement Bureau Board, A.D.A.
A.D.A. representative to Committee on Dimensional Standards for Utensils, American Standards Assn.
Delegate, A.D.A.
Member: Nominating, Program Planning, "Definition of a Dietitian," and Aims and Goals for Future Committees, A.D.A.
President and Section Chairman, N. Y. State Dietetic Assn.

Publications:
Articles in professional and business periodicals

Doris Johnson: B.S., M.S., Ph.D., University of Wisconsin; dietetic internship, The Johns Hopkins Hospital, Baltimore

Positions held:
Dietitian, St. Joseph's Hospital, Milwaukee
Research Assistant, Dept. of Home Economics, University of Wisconsin
Dietitian, Wisconsin State Sanatorium, Statesan
Dietitian, Edward J. Hines Memorial Hospital, Hines, Ill.
Ward Supervisor and Teaching Dietitian, Presbyterian Hospital, New York City
Assistant Professor, Foods and Nutrition, University of Wisconsin
Present position—Director of Dietetics, Grace-New Haven Community Hospital, and Assistant Professor, Yale University School of Medicine, New Haven, Conn.

Professional activities:
Chairman, Diet Therapy Section, A.D.A.
Chairman, Journal Board, A.D.A.
Chairman: Nominating and Diabetic Diet Calculations Committees, A.D.A.
President, Connecticut Dietetic Assn.
Chairman: Diet Therapy Section, Connecticut and N. Y. State Dietetic Assns.

Publications:
Author: *Modern Dietetics, Overweight Is Curable, A Laboratory Manual in Cookery*
Papers in this JOURNAL and other professional publications

DELEGATES-AT-LARGE

Elmira Blecha: B.E., Central State Teachers College, Stevens Point, Wis.; M.S., Wayne University, Detroit; dietetic internship, University of Michigan Hospital, Ann Arbor

Positions held:
Dietitian, Lima (Ohio) Memorial Hospital
Research Nutritionist, Simpson Memorial Institute, University of Michigan, Ann Arbor
Clinic Dietitian, Massachusetts General Hospital, Boston
Clinic Dietitian, University Hospital, Ann Arbor
Assistant Director of Dietetics, University Hospital, and Instructor in Dietetics, Department of Internal Medicine, University of Michigan
Present position—Instructor in Dietetics, VA Hospital, Houston

Professional activities:
Member: Placement Bureau and Dietetic Internship Boards, A.D.A.
Member: Nominating and Research on Dietary Study Methods Committees, A.D.A.
Delegate, A.D.A.
Vice-President, Michigan Dietetic Assn.
Secretary, Texas Dietetic Assn.
President: Ann Arbor and South Texas Dietetic Assns.

Publications:
Papers in this JOURNAL and other professional publications

Beulah Hunzicker: B.S. and M.S., University of Wisconsin; dietetic internship, University of Michigan Hospital, Ann Arbor

Positions held:
Dietitian, University Hospital, Ann Arbor
Dietitian, Presbyterian Hospital, Chicago
Present position—since 1936, Director of Dietetics, Presbyterian Hospital, Chicago

Professional activities:
President, A.D.A.
Vice-President, A.D.A.
Treasurer and Chairman, Finance Committee, A.D.A.
Chairman: Local Convention Arrangements and Program Planning Committees, A.D.A.
Delegate, A.D.A.
Member: Nominating and Constitution Committees, A.D.A.
President, Illinois Dietetic Assn.

Beula Becker Marble: A.B., University of Illinois; M.S., University of Iowa; dietetic internship, University of Iowa Hospital; study in London School of Economics, London, England

Positions held:
Research Ward Dietitian, Massachusetts General Hospital, Boston
Dietitian, N. Y. City Y.W.C.A. Camp
Volunteer Assistant in Dietetics, St. Bartholomew's Hospital, London, England
Research Unit Dietitian, Huntington Memorial Hospital, Harvard Medical School, Boston
Present position—Lecturer in Nutrition, Garland Junior College and Boston University

Professional activities:
President, A.D.A.
Vice-President, A.D.A.
Secretary, A.D.A.
Chairman, Diet Therapy Section, A.D.A.
Chairman, Journal Board, A.D.A.
President and Diet Therapy Chairman, Massachusetts Dietetic Assn.
Honorary Member, Massachusetts Dietetic Assn.
Member, Natl. Nutrition Committee, World War II

C. Frances MacKinnon: A.B., University of Montana; M.S., University of Michigan; graduate study, University of Chicago and Harvard School of Public Health; dietetic internship, Presbyterian Hospital, New York City

Positions held:
Nutritionist, American Red Cross, Colorado and Wyoming
Assistant to the Director, Nutrition Service, American Red Cross, Washington, D. C.
Assistant Director, Midwestern Branch, American Red Cross, St. Louis
Clinic Dietitian, University Hospital, Ann Arbor
Instructor in Dietetics, University of Michigan Schools of Medicine and Dentistry
Nutritionist, Bureau of Maternal and Child Health, Arizona Board of Health
Nutritionist, Children's Bureau, Washington, D. C.
Instructor in Nutrition, Harvard School of Public Health, Boston
Present position—Associate Professor, School of Public Health, University of North Carolina, Chapel Hill

Professional activities:
President, A.D.A.

Chairman, Diet Therapy Section, A.D.A.
Chairman, Journal Board, A.D.A.
President, Ann Arbor Dietetic Assn.

NOMINATING COMMITTEE

The following candidates (five of whom are to be elected) for the Nominating Committee for 1955–56, have been selected as representatives of five geographic areas determined on the basis of distribution of the membership. Members are to vote for one person from each geographic area.

Geographic Area I[2]

A. June Bricker: B.S., Battle Creek College; M.A., New York University; dietetic internship, University of Michigan Hospital, Ann Arbor
Positions held:
Assistant Therapeutic Dietitian, University Hospital, Ann Arbor
Assistant Dietitian and Director of Residence, Connecticut College, New London
Community Nutritionist, Council of Social Agencies, Manchester, N. H.
Nutrition Director, Connecticut Dairy and Food Council, Hartford
Present position—Director, Home Economics Bureau, Health and Welfare Div., Metropolitan Life Insurance Co., New York City
Professional activities:
Delegate-at-Large, A.D.A.
Member, Council of the House of Delegates, A.D.A.
Chairman, Public Relations Committee, A.D.A.
Member, Finance Committee, A.D.A.
Delegate, A.D.A.
Chairman, Community Nutrition Section Project, A.D.A.
President and Secretary, N. Y. State Dietetic Assn.
Vice-President, Connecticut Dietetic Assn.
Publications:
Articles in *Practical Home Economics*

Madge L. Myers: A.B., University of Kansas; M.S., Ohio State University; dietetic internship, St. Marys Hospital, Rochester, Minn.
Positions held:
Therapeutic Dietitian, Evanston (Ill.) Hospital
Therapeutic Dietitian, Billings Memorial Hospital, Chicago
Therapeutic Dietitian, and Assistant Director, Dietary Dept., Charity Hospital, New Orleans
Assistant Director, Dietary Dept., Ohio State University Hospital, Columbus
Present position—Director, Dept. of Nutrition, Peter Bent Brigham Hospital, and Instructor, Harvard School of Public Health, Boston
Professional activities:
Chairman, Diet Therapy and Professional Education Section Projects, A.D.A.
Delegate, A.D.A.
President, Ohio Dietetic Assn.
Vice-President, Illinois Dietetic Assn.
Secretary, Massachusetts Dietetic Assn.
Publications:
Papers in this JOURNAL

[2] Geographic Area I: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, and Pennsylvania.

Geographic Area II[3]

Margaret Dykes: B.S., Alabama Polytechnic Institute; M.S., University of Tennessee
Positions held:
Assistant Dietitian, Dietitian, and Head Dietitian, Alabama Polytechnic Institute, Auburn
Assistant Professor and Dietitian, Tennessee Polytechnic Institute, Cookeville
Dietitian and Resident Manager, Tapoco (N. Car.) Lodge
Assistant Professor, School of Home Economics, University of Georgia, Athens
Present position—Dietary Consultant, Division of Hospital Services, Georgia Dept. of Public Health, Atlanta
Professional activities:
Delegate, A.D.A.
President: Georgia Dietetic Assn. and Southeastern Hospital Conference of Dietitians
Chairman, Food Administration Section, Georgia Dietetic Assn.
Publications:
Articles in this JOURNAL and hospital periodicals

Ruth W. Spencer: B.S., Framingham (Mass.) State Teachers College; M.S., Columbia University; dietetic internship, Fifth Avenue Hospital, New York City
Positions held:
Assistant Dietitian, Danvers State Hospital, Hawthorne, Mass.
Assistant Dietitian, Massachusetts General Hospital, Boston
Dietitian, Dept. of Dining Halls, Yale University, New Haven, Conn.
Associate Director of Dietetics, Massachusetts General Hospital, Boston
Assistant Chief Dietitian, VA Branch Office, Boston
Present position—Dietetic Specialist, Dietetic Service, Veterans Administration, Washington, D. C.
Professional activities:
Co-Chairman, Local Convention Arrangements, A.D.A.
Chairman, Legislative Information, A.D.A.
Delegate, A.D.A.
President-Elect, Vice-President, Treasurer, and Chairman of Food Administration Section, Massachusetts Dietetic Assn.
Publications:
Papers in this JOURNAL, other professional publications, and hospital periodicals

Geographic Area III[4]

Margaret L. King: B.S., Battle Creek (Mich.) College; dietetic internship, Battle Creek Sanitarium
Positions held:
Assistant Dietitian, Henry Ford Hospital, Detroit
Present position—Director, Dept. of Dietetics, Henry Ford Hospital
Professional activities:
Delegate, A.D.A.
President-Elect, Vice-President, Secretary, Treasurer, and Chairman of Diet Therapy Section, Michigan Dietetic Assn.
Secretary, Detroit Dietetic Assn.

[3] Geographic Area II: New Jersey, Delaware, Maryland, Washington, D. C., Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, West Virginia, Tennessee, Kentucky, Arkansas, and Louisiana.

[4] Geographic Area III: Michigan, Ohio, Indiana, and Illinois.

E. Inistore Simms: Diploma, Alabama Girls Technical Institute (now Alabama College), Montevallo; B.S., University of Illinois; dietetic internship, Barnes Hospital, St. Louis

Positions held:
- Assistant Dietitian, South Side Unit, Youngstown (Ohio) Hospital Assn.
- Chief Dietitian, North Side Unit, Youngstown Hospital Assn.
- Present position—Director of Dietetics, Youngstown Hospital Assn.

Professional activities:
- Delegate, A.D.A.
- President, Secretary, and Treasurer, Ohio Dietetic Assn.

Geographic Area IV[5]

Marjorie M. McKinley: B.S., Indiana University; M.A., Teachers College, Columbia University; graduate study, Iowa State College; dietetic internship, Women's Educational and Industrial Union, Boston

Positions held:
- Associate Director and Acting Supervisor, Vocational Training Dept., Women's Educational and Industrial Union, Boston
- Supervisor, Institution Management, Simmons College, Boston
- Dietitian, Teachers College Cafeteria, Columbia University, New York City
- Instructor in Institution Management, Simmons College, Boston
- Assistant Professor, Dept. of Institution Management, Iowa State College, Ames
- Present position—Mary Swartz Rose Fellow, Iowa State College, Ames

Professional activities:
- Delegate, A.D.A.
- President and Chairman of Professional Education Section, Iowa Dietetic Assn.

Publications:
- Papers in this JOURNAL and other publications

Frances Welch: B.S., North Texas State Teachers College; M.A., Texas State College for Women; dietetic internship, Baylor University Hospital, Dallas

Positions held:
- Teacher of home economics, Caddo, Texas
- Lunchroom Manager, N. R. Crozier High School, Dallas
- Assistant Professor of Home Economics, North Texas State College, Denton
- Present position—Director of School Lunchrooms, Dallas Independent School District

Professional activities:
- Delegate-at-Large, A.D.A.
- Member, Council of the House of Delegates, A.D.A.
- Member: Finance and Constitution Committees, A.D.A.
- Delegate, A.D.A.
- President and Secretary, Texas Dietetic Assn.

Publications
- Papers in this JOURNAL and other publications

Geographic Area V[6]

Helen Rankin Demsey: A.B., M.A., University of Illinois; graduate study, Columbia University; dietetic internship, Mt. Sinai Hospital, New York City

Positions held:
- Dietitian, Mt. Sinai Hospital, New York City
- Supervisor, Nutrition and Health Education, Judson Health Center, New York City
- Director, Nutrition Canteen, Queens Chapter, American Red Cross
- Instructor in Diet Therapy, Adelphi College, Garden City, N. Y.
- Nutritionist, Div. of Maternal and Child Hygiene, Dept. of Health, Springfield, Ill.
- Present position—Director of Institution Administration, Mills College, Oakland, Calif.

Professional activities:
- Delegate, A.D.A.
- Chairman, Professional Education Section, California Dietetic Assn.
- President, Bay Section, California Home Economics Assn.

Selma A. Streit: B.A., University of Texas; graduate study, University of California, Columbia University, and University of Texas

Positions held:
- Chief Dietitian, Bethesda Hospital, Cincinnati
- Instructor in Institutional Management, University of Texas, Austin
- Dietitian and Business Director, Scottish Rite Dormitory, Austin, Texas
- Instructor in Institutional Management, Teachers College, Columbia University
- Present position—Director, College Housing and Food Service, and Associate Professor and Chairman, Dept. of Institutional Economics, Washington State College, Pullman

Professional activities:
- Member, Placement Bureau Board, A.D.A.
- Delegate, A.D.A.
- President, Texas Dietetic Assn.

[5] Geographic Area IV: Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas.

[6] Geographic Area V: Hawaii, Washington, Oregon, California, New Mexico, Arizona, Idaho, Utah, Nevada, Montana, Wyoming, and Colorado.

Thiamine Loss in Pre-Peeled Potatoes

The most satisfactory anti-darkening agent for pre-peeled potatoes has been found to be a solution of sodium bisulphite. Since this is known to be destructive to thiamine, E. E. Anderson, W. B. Esselen, and C. R. Fellers of the University of Massachusetts, Amherst, investigated thiamine retention in sulphited, pre-peeled whole potatoes and those cut for French frying.

Samples of both "old" Maine (Katahdin variety) and "new" Florida (Sebago variety) potatoes were used. Analysis by a modification of the method of the Association of Vitamin Chemists, Inc., showed that in whole potatoes, the Maine variety lost 11 per cent of its thiamine, while the Florida potatoes lost 13 per cent.

Losses of thiamine in the pre-peeled French fries were much greater—47 and 30 per cent due undoubtedly to the larger surface area which came in contact with the sulphite solution.—*Abstracted from* Food Technology *8: 596, 1954.*

Current Comment

A Visit with Miss Barbara Lacy[1]

YASUKO YOSHIDA

Nagoya National Hospital
Nagoya, Japan

People hurry down the street, with their faces buried deep in the overcoats. A piercing blast blowing hard, now and then even little flakes of snow were fluttering in the air. It was such a cold, cold winter afternoon.

Nagoya Air Force Hospital is no ordinary hospital. It is an awfully big one. Whenever I passed there, I could not but feel a sort of timidity for there were many jeeps and cars busily coming up and going out. It seemed as if the whole building had been mobilized for an endless work. But today I feel something different. Something unusual occupies my mind. I am going to visit the hospital with my friends. Yes, actually getting in and seeing an American dietitian! Trying to summarize what I want to ask her and what I must reply when asked in return, we hastened to the hospital. The six-storyed hospital, formerly Nagoya Office of Communications, stands near Nagoya Castle Heights.

WORLD BEHIND THE DOOR

We reached there and found two MP's gravely standing there in the spacious hall. When we were faltering at a loss, we saw through the big pane of the front door Miss Ko-Ko approaching us with a broad smile of welcome. We felt relieved and went in. It was so warm inside that I was almost getting dizzy. Everyone working there was in light summer clothes.

AMERICAN DIETITIAN

To the fourth floor by elevator! When we were waiting near a room with a "Food Service Office" sign put on the door, Miss Lacy came up to see us in a white short-sleeved uniform, a white cap with two blue lines, white stockings and white shoes. Everything white and she looked fresh (lively).

栄養士
バーバラ・レーシーさん
をたずねて
吉田泰子

First page of article, "A Visit with Miss Barbara Lacy," as it appeared in the Japanese publication, *Rinsho Eiyo*.

"How do you do," so saying she smiled at us. We did not know anything but hesitantly stammering. "You can ask her anything freely, she says," Miss Ko-Ko kindly helped us broach our questions. Seated deep in a chair, I tried to ask her first about a course required for becoming a dietitian in the States. "What is need for becoming a qualified dietitian in the States and staff of a hospital is first to be a member of The American Dietitians' Association. To be its member, we must learn dietetics or hospital management and the outline of chemistry at the domestic economic course of a university. After finishing the university course, we must further go through a practice for another year under the guidance of a dietitian at the certified hospital." She went on, showing us some interesting books such as, *Hospital Management* or JOURNAL OF THE AMERI-

[1] This article, describing a Japanese dietitian's visit and reactions to the Dietary Department of the Nagoya Air Force Hospital, is reprinted from the Japanese publication, *Rinsho Eiyo* (Clinical Dietetics) which is the Japanese counterpart for this JOURNAL in the United States. The editors have used the verbatim translation, feeling that much of the charm of the article would be lost with editing. The "Miss Barbara Lacy," to whom Miss Yoshida refers was Captain Barbara Lacy, USAF (WMSC), who has now been separated from the Service.

CAN DIETETIC ASSOCIATION. Turning over the pages of a book, I found every inch full of what I want to know.

ABOUT MENU

When I asked her how the menu for hospital diet is to be made and practiced, she told me, "The hospital specially made for an armed forces is like this. The main menu is made at Washington, D. C., and it becomes a guidance for arranging a menu at each base. At the hospital a special care is taken in adding a variety to the menu and preparing it to suit each patient's taste. The menu used here in Japan is published monthly in a pamphlet with a picture of beautiful Mt. Fuji on its cover, and it contains the materials served for each 100 persons a day." To my question on the kitchen equipment in the hospital, she nodded and took us to the kitchen. "Are you supervising those who are working here in the kitchen?" we asked. "Yes, of course. They are supervised by a dietitian and they are given a menu and a list for quality of food to be provided each day," she replied. I heard each one of them was an expert cook. The kitchen was a spacious room with modern food service facilities and scores of specialized items of equipment like gas-stoves, toasters which are said to toast each twenty-four slices of bread at one, gas and electric-ovens, electric grills which (boil) roast eggs and meats, etc. The kitchen adjoined a large dining room. We went in there. It contained a big shelves with stainless trays lined in rows. When seeing them carefully I found them not trays but plates. Dessert, bread, or salad is served in each plate which is divided according to a menu of the day. "This is very handy. But I don't like it myself for it's prosaic. It's just convenient for washing, that's all," she explained.

LIKE RESTAURANT'S TABLE

In order to keep the cooked meals warm, there is a big steam table vaporing up briskly between the kitchen and the dining room. It was really one of the fascinating equipment I saw. In front of this table is a big box which contains knives, spoons and forks. There are also bread, cookies and jellies piled up on the big plates. Though invisible, it seems to me there is a consistent order behind. Dazzlingly white cloth over the table; napkins in the center; salt; pepper; mustard; sugar and many other spices prepared there. As I noticed something like a tank in the center of the dining room, I asked her if it had hot water in it.

She denied, saying it was coffee. "Everyone may take it as much as he wants," she added. "We are washing dishes this way," so explaining she pushed a button at a corner of the room. Dishes are carried by a belt-conveyor through a long box-like tunnel which is always gushing out hot steam, thereby washing and sterilizing the dishes before they come out of the tunnel. Just push a button and dishes on the belt—what a handy machine! It is really interesting to watch it work.

DISH CONTROL IS NOT SEEN

When we asked how food are taken to each ward, she showed us a food cart in the corridor. It was a shining cart and looked light as if it had begun moving before we touched it. On its top are placed soup, coffee, or meats, and in its side are contained dishes. The cart also has a electric cord which is able to keep food on cart warm. When asked if patients eat from the dishes on bed, she said no and ordered a tall Japanese man by side to fix a food tray for us. It was a folded tray and paper on the top of the tray with an Air Force mark and two crimson-like lines is changed at each meal. All dishes are white and have a crimson-like Air Force mark and two lines there. There are salt, pepper, white sugar, a knife, fork, and spoon on tray. The plate is rather thin and 7 to 8 mm. thick, I suppose. When we asked about breakage-rate of these thin dishes, she made a puzzled look and said, "They are not broken so easily as you guess. Yes, somebody dropped a dish on the floor the other day, but it did not break."

FOOD STORE ROOM IN GOOD ORDER

Switching the subject to the food, we asked her whether it comes from the States. "Let's go to the store room," saying so, she took us there. A store room we first went in was one that keeps meats. Butcher shop, they call. In the center of the chill-felt room was a big board about 1 square meter. When asked what it was for, she said, "We do not wash the board with soap and water on which the meat is cut. It is scraped by knife when surface gets soiled." There placed a meat-cutter machine with which meat is sliced. Then when we went to another store room where canned food and spices were kept in good order with identified cards. Not only meats but vegetable come all the way from the States, well frozen.

CLEANLINESS AND ORDERLINESS

It was about meal time and food carts were sent by elevator, carrying chopped raw cabbage, over 150 gm. slice of steak, butter and potatoes, and one slice of bread wrapped in paper napkin, and Blue Seal milk in waxed square paper box and red jellies, etc. Cleanliness and orderliness are kept in every part.

IS IT OUR DREAM?

Enough number of workers, besides dream-like handy machines and clean dishes, and food like an extract of nutriment—when we compared our hospital food service with these thing, we felt that our work is still far from that of the USAF Hospital.

We left the hospital, promising to come back again, next time we will learn about special diet.

Outside the hospital there were already some snow on the ground. In all its aspects, serving food warm is a difficult problem to us. However, before complaining about it, let's give more thought to our hospital diet. We came back to our hospital in snow, thinking of improvement of our work. In our National Hospital the wind was blowing through the corridor.

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An American Dietitian in Paris[1]

MARGUERITE QUENEAU

Associate Nutritionist
New York State Department of Health
Albany, New York

In many American offices, we see a one-word slogan, "Think." In France, I never saw this written, but from the time I arrived in October , 1953 until my farewell in September, 1954, I was feverishly, sometimes desperately, trying to do just that. The immediate and continuous stimulation to intellectual effort is one of the ways in which I, the visiting teacher working under a Fulbright grant, was quickly made a debtor and challenged to try to give the best I could in exchange.

For you to understand the cultural setting, the agency, and the worker, in their relationships, may I presume to give a few personal facts? Born in the United States of an American mother and a French father, I went to Europe at the age of two and a number of other times since. The wars made some of these visits last for many years and meant that my education was a of very mixed and bilingual character. I cannot remember learning to speak either French or English (the result is not remarkable—"master of none") which perhaps gave me the advantage of acquiring a lasting feeling for the many intangibles expressed through language. All of my technical education was in the United States (in home economics at the University of Minnesota, in diet therapy at the Minneapolis General Hospital, and in child development at Columbia University).

In 1930–31, after several years of hospital dietetics in the United States, I did out-patient teaching and home visiting in the Paris hospitals for eighteen months, but since that time, until my assignment last year, I had made only one brief visit to France three years ago. The ties of friendship and of mutual understanding had never been broken, however, and some of the very people I had worked with were there, and still are, to welcome me and others who may follow me.

Since the objective of the Fulbright program is "to foster international understanding as well as to assist individuals in furthering their professional development," it is with some misgivings that one starts on such a project. However, as hospital dietitians and even just as women, we have the advantage of concrete work to do which relieves us from dwelling overly long on our shortcomings. The first day on the job in Paris I was invited to criticize a forthcoming booklet on child nutrition, and the second day I was at the hospital for ward rounds, in the diet kitchen for recipe testing, and in the office for making out lesson plans.

My formal assignment was to the Institut National d'Hygiene, a section of the French Public Health Service in their research and educational aspects. The nutrition section is directed by Dr. Jean Trémolières, who also has a medical service at one of the large public hospitals, the Bichat, where my actual work was centered.

There are opportunities for therapeutic and laboratory research in the hospital center, and there is a special diet kitchen for preparing the food of the patients who are studied. This unique combination of treatment and research creates a most favorable teaching situation for the young French dietitians. A recipe can be developed, the food prepared, the patient fed, his reaction noted, the biologic tests made in the laboratory, and the clinical results observed on the ward rounds all within a comparatively short time. When the same physician is the classroom teacher and the ward physician, an unusually excellent learning situation is created and a therapeutic advantage accrues to the patient as well. Other physicians and surgeons have grown to appreciate the benefits obtainable for their patients, particularly for the very ill, such as those with severe burns and gastrointestinal disorders.

In addition to the hospital training and service, I was interested in some of the survey work done at the Institut National d'Hygiene—for example, detailed analyses of the food intake in tuberculosis sanatoria throughout France. Many of the problems are similar to ours in New York State.

THE COURSES

The Bichat is the teaching center for the second-year theoretical study and for some of the practical hospital experience of the student dietitians. There are other affiliations for them, including one at the Villejuif cancer center, where additional experience in surgical dietetics is provided. It was to this training, corresponding somewhat to our fifth-year hospital internship, that most of my attention was given. I assisted the dietitians with the diet kitchen service and the supervision of the student dietitians;

[1] Presented at the 37th Annual Meeting of The American Dietetic Association in Philadelphia, on October 29, 1954.

with the elaboration of reference tables for balance studies; and in teaching the ten students of the Ecole Nationale. The classes followed the medical lectures given by the physicians (which I attended) as closely as possible. We wished to continue the topic discussed, whether of nutritional needs or disease conditions, for the purpose of bringing out the practical aspects of dietary management. We also started an outline which we hoped would serve as a first syllabus for the French staff another year.

These courses given by several doctors were of such a level that I burned the midnight oil, not only to make translations and adaptations from American sources, but also to try to learn enough myself to be able to follow the next lecture—which always seemed to be tomorrow! I would like to mention here that one of my most valuable references was the *Handbook of Diet Therapy* (1), which served well both in its approach to fundamentals and as a guide to therapy.

Formal training for hospital dietetics was started not in Paris, but in Marseille. To have been invited there to teach two weeks last spring by the director was an opportunity much appreciated and enjoyed. You will share my feeling of "belonging," when I tell you that a hand-made hospital cap was given me by the Marseille group; thus my own brand of uniform in France was the Paris public hospital coat and apron, worn with the Marseille veil.

HANDS-ACROSS-THE-SEA

I would like to express my own gratitude and that of my French colleagues and students for the unsolicited and generous professional contributions to the establishment of qualified dietitians in France. Massachusetts dietitians are assisting Parisian dietitians with books, and New York State dietitians, have sent a set of reference books and periodicals to Marseille. The American Library of our State Department has also obtained several references for Marseille students and has provided them with a quiet study corner.

LANGUAGE PROBLEMS

Each day made me more cognizant of the extraordinary importance of language. When we say "barriers," we emphasize the frustration and paralysis which come from our inability to understand or be understood. When we say "bridges" or "keys," we express the truly amazing values that such knowledge brings to them and to us. And the better we know a language, the more humble we become in confronting the untranslatable. As John Ciardi recently brought out in the New York *Times*, we must be concerned with playing the music, not with ascertaining the notes. But how far along the road to knowledge and insight one needs to be to make the music harmonious!

Language with its infinite meanings, its interpretations for weal or woe, was never appreciated by some of us as it was at the Sèvres International Conference last June. Persons from fifteen nations met for several weeks to discuss the many factors affecting today's family. To give only one example from our nutrition subcommittee, we struggled over understanding the terms "foods," "nutrition," and "dietetics." No one was trying to promote the adoption of any specific definition, either in French or in English, but even with such goodwill, we found that when we thought we had a satisfactory translation in both French and American English, the British English meanings were almost the reverse of ours!

Also, in discussing the "school lunch," we immediately had to change the term to "school meal" because it is not a noon nourishment everywhere. The values attached to the family varied from one national group to another and were reflected in the use of the words throughout the sessions. The discussion of the French attitude was complex. An institutional meal was not looked on as universally desirable. Indeed, child feeding outside of the home goes counter to the deepest ideal of French family life. The family meal is central, both symbolically and actually. While it is true that many school canteens have been established, they are considered poor substitutes for the home, the "shadow" for those not privileged to have the "substance." Neither language alone nor technical knowledge, nor understanding of social factors could avail. Only by caring for an objective beyond us all, but of mutual concern and eventual benefit, could these aids be used.

DIETETICS DEVELOPS

Dietetics is now a recognized profession. In November 1953 the first competitive federal state board examinations were held, and promising trained personnel are now at work in various parts of France.

The French Dietetic Association is not yet a year old, but already it has given proof of its value. There is a quarterly *Journal of Dietetics and Nutrition*, and in November 1954, the Association sponsored an institute of several days for in-service training. It was a touching and rewarding experience to be taken into the organization as a founding member, their vice-president, and a member of their council.

WHAT OF THE PEOPLE?

Several qualities in my French colleagues seemed outstanding to me: the close relationship between doctor, patient, and dietitian; the sensitivity to human needs; and a lively spirit of inquiry and imaginative perception. May these be held to, through the coming recognition of the dietetic profession!

What are the French student dietitians like? They are unspoiled and free from affectation. Their

education is of a high order in cultural value and would compare to our average post-graduate level. They have a fine sense of discrimination. They are appealing, disarming, and maddening. This combination means that the teacher must think out the reasons for the teaching being given. The "why" is passionately interesting to them, and they have a genuine concern for the possible effects on people of the application of principles. For us, who jump from principle to technique, such discipline is of great value.

What do we seem like to them? The impact of that question is sobering; in spite of oneself, one realizes that one represents abroad a group, a profession, even a nation. One feels suddenly alone and ardently wishes to be better than at home; one feels responsible but also so eager to bring "whatsoever things are true" from our land to theirs.

Many times I envied Willa Cather's quality of understanding, her great gift for interpreting each foreign group in their adaption of American life. In *Death Comes for the Archbishop* and in *Shadows on the Rock*, one could be persuaded that she was French, but her tales of the Bohemians, the Scandinavians, and the Anglo-Saxon Virginians show that her secret lay in her deep insight, enabling her to express each struggling pioneer's dream.

In our hospital and community work, we know that it is only in listening to a patient that we learn enough to help him. How often we say, "it is rather the patient who taught us"—lessons in living, if not in diet therapy! We can give only if we are also ready to receive and share. From work abroad, the most prized gain may be the new light on oneself, one's work, and one's people. Our American Archibald MacLeish has said, "The more I have traveled, the less I have departed," only reinforcing Kipling's meaning when he queried, " What do they know of England, who only England know?"

An American colleague, after living in France, expressed much when he said at the end of a year, "Never could I give enough to make up for what I have received." Only afterwards, in the way we ourselves teach and the way we welcome and sustain those who come from afar to us, will we show whether our preparation was such that we went overseas usefully and returned home worthily.

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Food Intake of Greek Farm Families[1]

CORA MILLER, Ph.D.,[2] AND THEODORA KAUMVAKALI[3]

This study was undertaken to obtain information on the amount and kinds of food generally eaten by farm families in Greece so that practical suggestions could be made which would be useful to the home agents in the extension program in Greece. It was also inspired by the many comments from all quarters that undernourishment was widespread among farm families. The U. S. Educational Foundation in Greece gave the senior author an extension of her Fulbright Lectureship Award to make the study.

Inventory blanks were prepared listing foods known to be in season in the spring and available in villages. Homemakers recorded inventories at the beginning and end of a week and their purchases and the garden supplies used during the week. Home extension agents cooperated in obtaining the records by making the direct contacts with the families.

Records were obtained in early June 1953 from 133 families from more than 100 villages in Rhodes and on the mainland of Greece. This sampling represented 711 individuals: 388 adults, 165 adolescents (ten to twenty years of age), 158 children, and 2 babies under one year.

Nutrients were calculated according to the values of foods per pound (AP) from the Agriculture Handbook No. 8 (1). Values for soft wheat were used throughout. No value for calcium in water or spinach was considered. In foods ordinarily served cooked, a 50 per cent loss in ascorbic acid was deducted. The family allowances according to age and sex of family members were determined using the 1953 recommended allowances of the National Research Council (2). The number of families which fell short in the various nutrients are given in Table 1 by proportion of the allowances obtained.

In an attempt to obtain a more complete picture because of the seasonal influence on one week's intake, a second list of food was prepared. Homemakers were asked to estimate how many times a week they provided all members of the family with a full serving of a given food during the time it was in season. From the length of the season, we were able to estimate the total number of servings obtained during the year. We compiled estimates from 548 families. In Table 2 is given the per cent of these families consuming various amounts of foods in the Basic 7 groups.

DISCUSSION

The findings of this study are similar to those of Tsongas as reported by Allbaugh (3) made in Crete a few years earlier. That is, high incidences of shortages were found for calcium, vitamin A, and ribo-

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flavin. In addition, many families had low intakes of ascorbic acid not considered in the Crete study to be low. Crete, however, is the chief citrus-producing area of the country, and the records there were obtained in the fall when many ascorbic-acid-contributing foods were in season; also, no deductions for cooking losses were made.

Except in Crete and the Peloponnesus, which also produces oranges, mandarins, and lemons, it is doubtful if the majority of farm families obtain citrus fruits in appreciable quantity. Most of the estimates for ascorbic-acid-rich foods given in Table 2 were from raw cabbage and tomatoes. However, the seasons for these foods are long, and strawberries, mulberries, melons, green peppers, and raw greens materially augment the ascorbic acid intakes at other seasons. At the time our records were obtained, only a few greens were in season. Most of the year the ascorbic acid intake would be considerably better than shown in this study. The home canning of tomatoes and increased use of saurkraut are being promoted in the extension program as a method of providing more ascorbic acid during slack seasons.

The families who obtained sufficient vitamin A to meet the allowance ate greens. Only one family had liver during the week. Wild greens, as well as a wide variety of garden greens, are utilized. The fact that 90 per cent of the families estimated less than five servings a week of leafy green and yellow vegetables suggests the desirability of increased consumption of yellow vegetables. Sweet potatoes are not grown, and winter squash is used only for animal feed. Carrots have not been popular, being utilized more as a flavoring ingredient in soups than as a vegetable. Improved varieties were appearing on the market in 1953, however, and the trainees at the University of Salonica received them enthusiastically, both raw and cooked. If greens were served three times a week, however (Table 2), with the possibility for body storage and the consistent presence of olive oil (as seasoning) favoring absorption of vitamin A, it would seem that serious shortages in this nutrient during the year would be unlikely. Furthermore, the portions are larger than the sizes of servings used in most food tables, and appreciable quantities of vitamin A are provided by snap beans, peas, and okra, as well as greens. Brined vine leaves, dried okra, apricots, and tomato paste would also provide small amounts when fresh foods are unavailable.

Increased production of milk and/or cheese would seem to be necessary for the families to meet calcium allowances. At the same time, increased milk would contribute needed riboflavin and animal protein (Table 1). A number of families when interviewed stated that they used no milk products; others obtained milk only for the children. Milk is consumed primarily as yoghurt and fedda (white cheese). Little is used in cooking, and even the bread is made with water. Goats and sheep as well as cows are used as milk animals. Canned and dried milk were available on the market but were not used by farm families. Sources of calcium which were not considered were: the water, beer, and bones of small fish.

Most of the allowances for protein, iron, thiamine, and niacin, as well as calories, were supplied by the whole wheat flour. Six of the seven families not meeting the allowances for iron ate all white bread and were the only families with thiamine shortages. Bread continues to constitute the bulk of food in the diet of the farmers; families reported that it was not unusual for an adult to consume more than half an oke (about 1½ lb.) per day. Most of the families use their own home-grown wheat, making the bread with only flour, salt, water, and starter. Those families with low intakes in calories may well have been "at the bottom of the barrel" in their wheat supply. Sometimes a portion of the crop is sold in the field in order to buy food until the harvest. Fats, rice, and macaroni also supplied considerable calories.

TABLE 1

Nutrient intake of deficient families in terms of percentage of Recommended Dietary Allowances (2)*

PERCENT OF ALLOWANCE OBTAINED	NUMBER OF FAMILIES									
	Calories	Protein		Calcium	Iron	Vitamin A	Thiamine	Riboflavin	Niacin	Ascorbic acid
		Total	Animal							
1–9	0	0	(2)	0	0	0	0	0	0	0
10–19	0	0	(19)	1	0	10	0	0	0	18
20–29	0	0	(34)	1	0	17	0	0	0	18
30–39	0	0	(28)	10	0	13	0	1	0	15
40–49	0	0	(13)	14	0	10	1	4	0	12
50–59	0	0	(25)	9	1	6	0	10	1	21
60–69	3	0	(11)	24	0	8	2	14	0	9
70–79	6	3	(1)	18	2	10	0	7	0	5
80–89	8	3	0	17	2	10	1	20	0	11
90–99	8	6	0	12	2	1	1	12	0	4
Total	25	12		106	7	85	5	68	1	113

* 133 records.

Little sugar is used except for making preserves, which traditionally are offered only to visitors as a hospitality gesture. Obtaining sufficient calories did not seem to be a problem for most families, however. This conclusion is supported by height-weight data obtained for 84 men and 110 women over twenty-five years of age. Twelve men and eleven women were under the minimum desirable weight for height given by National Research Council (2) while six men and twenty women were overweight

Production and preservation of meat are believed to constitute the most serious food problem. There was considerable concern about the lack of animal protein in farm diets. Students at the University of Salonika, for example, were unwilling to believe one could obtain an adequate diet without meat. Our records showed that half of the families obtained sufficient animal protein to contribute at least one-third of the protein allowance and June was not the month for butchering. Allbaugh quotes the work of Tsongas (3), in which low intakes of animal protein were also found. Tsongas concluded, after having examined a large group of school children as well as through casual observation, that increased meat consumption, though desirable, was not essential.

As far as the completeness of the protein of the diets is concerned, it would seem that whole wheat alone, consumed in such quantities, would provide all the essential amino acids for maintenance if not for growth. Other foods, such as dry legumes, nuts, and rice, are consumed in quantity the year around and would increase the biologic value of the whole wheat proteins. Dry beans, for example, would contribute appreciable quantities of lysine in which whole wheat is low. The satiety value of meat cannot be denied, however. Farmers who had canned meat to take to the field stated that they felt better.

Canning preservation of meat is taught in the extension program but the cost of containers still limits this practice in spite of a windfall from CARE in the fall of 1953. Lack of pressure canners also limits canning. Each homemaking worker has been provided with at least one canner, but she may service as many as fifteen villages and, of course, many families butcher at the same time. Sausages are covered with lard or dried in casings, and the curing of meats is practiced. The raising of rabbits and chickens was being encouraged as a good method of obtaining a more equitable distribution of meat throughout the year by sidestepping the preservation problem. Increased consumption of fish would also be desirable. That fishing has not been exploited as fully as in neighboring countries with shorter coastlines is due, no doubt, to lack of refrigeration and partially to inadequate fishing facilities.

In regard to the fat content of the diet, olive oil remains the preferred fat although sesame and cottonseed oil were frequently cheaper and were becoming more widely used, especially for frying. Families raising pigs also utilized the lard in cooking and welcomed instruction in lard-rendering methods. Farm families usually used no fat spread for their bread. With a reputation for consuming unusually large quantities of oil, it was surprising to find that in our dietary records only half the families had sufficient total fat intakes to provide one-third of the caloric allowance. The seemingly large amounts used in cooked dishes and salads obviously did not make up for the absence of spread on the bread.

Few families included olives in their weekly food

TABLE 2

Estimated intake of food of 548 families in terms of Basic 7 groups

FOOD GROUPS AND RECOMMENDED SERVINGS	PERCENTAGE OF FAMILIES						
	Less than 1 serving weekly per person	1 to 2 servings weekly per person	3 to 5 servings weekly per person	5 to 7 servings weekly per person	7 to 14 servings weekly per person	14 to 21 servings weekly per person	Over 21 servings weekly per person
Leafy green and yellow vegetables (17 or more servings)	2	17	72	7	2	0	0
Citrus fruit, tomatoes, cabbage (7 or more servings)	1	7	49	32	10	0	0
Other fruits and vegetables (14 or more servings)							
Potatoes	13	44	41	2	0	0	0
Others	3	55	37	4	1	0	0
Milk and cheese (14 or more servings)	11*	9	17	35	26	2	0
Protein (7 to 14 servings)							
Meat	81	17	2	0	0	0	0
Fish, chicken, game	38	42	18	2	0	0	0
Eggs	21	39	30	10	0	0	0
Legumes and nuts	16	48	34	2	0	0	0
Cereals							
Rice and macaroni	0	59	41	0	0	0	0
Whole wheat (7 or more servings of whole grain)	0	0	0	0	0	0	98

* 5 per cent reported that they used no milk or cheese.

records, due undoubtedly to the season, for olives are generally consumed in quantity, the production of the country being approximately 40,000 tons per year. They are popularly believed to be highly nutritious, and many families eat only bread and olives for long periods. We examined five methods for curing olives, and in each, either a salt- or lye-leaching process was used; in some methods, the fruit was even slashed or beaten to make it more permeable. Obviously, little soluble nutrients could be left.

We might mention also a few traditions and practices not considered in food intakes but which contribute to the nutrition of the farm people in small ways. For example, families visiting cemeteries in memory of a loved one take boiled sweetened whole wheat, most of which is given to the poor. *Trahana* is dried in fall for winter use. Since it contains eggs as well as milk and flour, it would seem to be a nutritious food even though it is cooked in water. Tomato paste and dry onions are lavishly used; most cooked dishes are seasoned with them. The heads and entrails as well as the flesh of animals are used. Snails, eels, and octopi are eaten. Toasted chickpeas, often mixed with raisins, and various seeds are used as snacks. Much of the fruit and large quantities of vegetables are consumed raw.

We concluded from the information that we obtained that undernourishment was not widespread at present. The variety of foods in the week's record was very limited. The number of families receiving less than 70 per cent of allowances for most nutrients was small, however, and with the possible exception of calcium was probably larger than would be found in other seasons. This is not intended to minimize the malnourishment that no doubt exists. We do know, for example, that in some areas corn is used as the chief cereal, and many families stated that they used few fresh vegetables. However, the country now produces sufficient wheat and rice for its own use, and two gardens a year are possible in most areas. The major problems would seem to be the better utilization of existing and potential supplies rather than gross insufficiency in any one food group.

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Exercise and Weight Control

"Inactivity is the most important factor explaining the frequency of 'creeping' overweight in modern Western societies," according to Jean Mayer, Ph.D., D.Sc., Harvard School of Public Health. In speaking before the Weight Control Colloquium at Iowa State College, January 20, Dr. Mayer pointed out that "natural selection, operating for hundreds of thousands of years made men physically active, resourceful creatures, well prepared to be hunters, fishermen, or agriculturists. The regulation of food intake was never designed to adapt to the highly mechanized sedentary conditions of 'modern' life, any more than animals were made to be caged.

"Adaptation to these conditions without development of obesity means that either the individual will have to step up his activity or that he will be mildly or acutely hungry all his life. The first alternative is difficult. Present-day conditions in the U. S., particularly in the cities, offer little inducement to walking and are often poorly organized as regards facilities for adult exercise. Even among the young, highly competitive sports for the few are emphasized at the expense of individual sports which all could learn and continue to enjoy after the high school and college years are over.

"But if the first alternative, stepping up activity, is difficult, the second alternative, i.e., life-time hunger, is so much more so that to rely on it for weight control programs can only continue to lead to the fiascos of the past.

"Strenuous exercise on an irregular basis, in untrained individuals already obese is obviously not what is advocated. But a reorganization of one's life to include regular exercise adapted to one's physical potentialities is a justified return to the wisdom of the ages."

Dr. Mayer explained that "in most types of exercise, no heavy object is moved, other than the whole or parts of the body. Therefore, the energy cost of exercise is proportional to body weight. If excess body weight is so great that it impairs body movement, this relationship will not strictly apply and the cost of exercise will actually increase faster than body weight.

"If the energy cost of exercise is approximately proportional to body weight, it follows that the overweight person will require more energy, and hence burn more body reserves for the same amount of exercise than would a slimmer individual."

Where the problem really comes in, Dr. Mayer feels, is that if a heavy person is likely to be the "inactive" sort, less energy will be expended moving the extra weight and hence weight gain will be more rapid and more pronounced. "A sedentary person will therefore be exposed to the danger of overweight to a much great extent than an individual who makes a practice of daily—or at least frequent—physical exercise."

Current Literature

Contributed by Mildred Bonnell and administrative dietetic interns, University of Washington, Seattle; Janette C. Carlsen and Ethel M. Miller, The Johns Hopkins Hospital, Baltimore; Marjorie Cheney, Dietetic Intern, Va Center, Los Angeles; and Elizabeth H. Tuft, Wesley Memorial Hospital, Chicago

AMERICAN JOURNAL OF DIGESTIVE DISEASES

Vol. 21, December, 1954

* Comparative effects of dietary fat and dextrin on mineral oil toxicity in the mouse. B. H. Ershoff and S. M. Greenberg.—p. 363.

Effects of Fat and Dextrin on Mineral Oil Toxicity. Immature male mice were fed a purified, low-fat ration supplemented with mineral oil at levels of 5, 7.5, and 10 per cent of the diet. The higher levels of mineral oil resulted in a marked retardation of growth and the occurrence of alopecia. No growth retardation or alopecia occurred at the 5 per cent level. Supplements of cottonseed oil or hydrogenated coconut oil at a 10 per cent level in the diet significantly increased the weight increment of immature mice fed a low-fat ration containing 7.5 per cent mineral oil. These supplements decreased but did not prevent alopecia. Substitution of white dextrin for dextrose as a source of dietary carbohydrate in the low-fat ration not only counteracted the growth-retarding effect of mineral oil but prevented alopecia as well.

THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES

Vol. 228, December, 1954

* Lack of effect of fat ingestion on blood coagulation. P. R. Manning and R. L. Walford.—p. 652.

Fat Intake and Blood Coagulation. It has been suggested that a decrease in dietary fat may result in a fall in postoperative thromboembolic episodes. The present study was undertaken to confirm the postulation that the blood clotting time was accelerated in patients who had ingested a meal containing 85 gm. fat. Amounts of fat ranging from 29 to 96 gm. in the form of cream, and a butter-egg-bacon meal containing 85 gm. fat were administered. No statistically significant change in the blood coagulation time, prothrombin consumption time, or clot retraction was demonstrated.

THE AMERICAN JOURNAL OF NURSING

Vol. 54, December, 1954

* Amebiasis. E. C. Faust.—p. 1507.

Amebiasis. Because amebiasis is prevalent throughout the world and because it usually is insidious in its development, there is great difficulty in interesting public health authorities and the population at large in this disease. The basic hazard in this disease is the carrier. Transmission takes place when, through personal ignorance or carelessness and the unsanitary disposal of human excreta, viable cysts pollute drinking water or food, or otherwise get into the mouth and are swallowed. In highly suspected regions where drinking water is not certified as safe, the individual may protect himself by boiling the water, passing it through a suitable filter, or by disinfecting it with chlorine or iodine tablets. Food which has been thoroughly heated or frozen is safe to eat, provided it is not contaminated by flies or roaches or infected handlers after it has cooled. This means that food handlers should be examined periodically to guarantee that they are ameba-free. They should not be allowed to handle food until an infection has been eliminated. Flies and roaches should be strictly controlled. Salad greens and strawberries, which are grown in tropical and sub-tropical areas or in oriental countries, constitute another potential source of exposure to amebiasis. However, lettuce leaves which have been thoroughly soaked in strong vinegar (5 per cent acetic acid) for 15 min., then rinsed in cold, boiled water, and chilled in the refrigerator are relatively safe, while strawberries plunged into hot syrup for a minute, removed, and chilled are safe to eat.

ANNALS OF INTERNAL MEDICINE

Vol. 41, November, 1954

Endemic goiter: a problem in preventive medicine. D. Marine.—p. 875.

* Occurrence of accumulation of fat in the liver and its relation to excess weight gain in patients convalescing from viral hepatitis. A. R. Colwell, Jr.—p. 963.

Weight Gain in Patients with Viral Hepatitis. A significant degree of abnormal hepatic fat was demonstrated by needle biopsy to occur in one-half of 144 soldiers with infectious hepatitis. Gain of body weight in patients with fatty livers was more than twice that in those without hepatic fat. It is concluded that increased fat intake, perhaps associated with a "relative protein deficiency," was responsible for the fat deposition.

ARCHIVES OF INTERNAL MEDICINE

Vol. 94, December, 1954

* Continuous therapy of nephrotic syndrome in children with corticotropin gel. A. J. Merrill, J. Wilson, and L. F. Timberlake.—p. 925.

* Triopathy of diabetes. Sequence of neuropathy, retinopathy, and nephropathy in one hundred fifty-five patients. H. F. Root, W. H. Pote, Jr., and H. Frehner.—p. 931.

Differential diagnosis and treatment of hemorrhagic diseases. E. E. Osgood, R. D. Koler, and M. E. Hughes.—p. 956.

Survey of the 1953 hematology literature. S. Wright, D. S. Mabry, R. D. Carr, and A. M. Perry.—p. 995.

Corticotropin Gel in Treating Nephrosis. Twenty-five nephrotic children have been treated with continuous corticotropin gel. Most patients can return to full activity in two to six weeks. While relapses have occurred, the course of twenty-four suggests that all will be well eventually. This appears to be a satisfactory form of therapy, though there is no evidence that the underlying process is cured or even shortened.

Triopathy of Diabetes. A triopathy, consisting of the sequence of neuropathy, retinopathy, and nephropathy, in 155 diabetic patients is presented. Until more exact information regarding the basic biologic defects causing these diabetic sequelae is available, early and continuous attempts at control of diabetes are necessary if the lesions of the triopathy are to be prevented or postponed.

THE BRITISH JOURNAL OF NUTRITION

Vol. 8, No. 4, 1954

* Food waste and loss of weight in cooking. G. M. Chappell.—p. 325.

* The microbiological assay of 'vitamin B_{12}' in the milk of different animal species. M. E. Gregory.—p. 340.

Supplementary value of vegetable-milk curds in the diet of children. V. Subrahmanyan, S. K. Reddy, M. N. Moorjani, G. Sur, T. R. Doraiswamy, A. N. Sankaran, D. S. Bhatia, and M. Swaminathan.—p. 348.

The nutritional properties of killed Bacterium coli. R. S. Roberts.—p. 353.

* Intestinal absorption of glucose in protein-deficient and in starving rats. H. Heller.—p. 370.

Effects of adding penicillin and aureomycin to the diet of cats. C. D. Dickinson and P. P. Scott.—p. 380.

Food Waste and Weight Loss in Cooking. A table of the change of weight of various foods during domestic cooking is presented. Loss of weight varied between 13 and 37 per cent for puff pastry, 7 and 33 per cent for grilled fish, and 13 and 39 per cent for roast meats. Green leafy vegetables generally gained weight on boiling. The comparison of loss or gain of weight of meat, fish, and vegetables in this study shows fairly good agreement with earlier experiments. A list of the preparation wastes for fruits, vegetables, and fish is also given and average values are compared with those in tables of food composition. It was seen that wastage in the preparation can be more than 75 per cent of the purchased portion (spring greens) or as little as 1.2 per cent (new potatoes). Few mean values were below 10 per cent, and 17 of the 45 values recorded reached 25 per cent. If careless or extravagant use of foods in the kitchen is superimposed on essential wastage, the cost of edible portions becomes unnecessarily high.

Vitamin B_{12} in the Milk of Differ-

ent Animal Species. Colostrum of the cow and goat, and milk of the cow, goat, woman, sheep, pig, and rat were assayed for vitamin B_{12} by three different assay organisms: *Lactobacillus leichmannii*, *Bacterium coli*, and *Ochromonas malhamensis*. Vitamin B_{12} activity of the milks was found to be due almost entirely to cyanocobalamin. In milk of all the species tested, the cyanocobalamin was present in a bound form. Enzyme digestion did not increase the value obtained for the cyanocobalamin content of milk from the cow, goat, ewe, and rat or of colostrum from the cow and goat.

Intestinal Absorption of Glucose. Intestinal glucose absorption was studied in rats fed on three protein-deficient diets and in rats fasted for 48 and 96 hr. The mean amounts of glucose that disappeared from the gastrointestinal tract during a standard period were reduced in protein-deficient rats, with significant delay in discharge from the stomach. In addition, there was some decrease in the rate of absorption of glucose from the intestine. Alimentary glucose-tolerance curves in the protein-deficient rats and rats starved for 48 hr. did not differ substantially from those of controls. Absorption in rats starved for 48 hr. was decreased, although there was no delay in gastric emptying time. Rats deprived of food for 96 hr. showed in most instances an accelerated discharge of glucose from the stomach, but the absolute amounts absorbed from the intestine were much the same as those in the controls. Rats starved for 96 hr. showed a markedly exaggerated hyperglycemic response. No histologically demonstrable abnormalities were found in the small intestine of the rats fed the protein-deficient diets or of animals starved for 48 hr. Results also indicated that the weight of the controls increased slowly while that of the protein-deficient animals decreased progressively.

THE CANADIAN MEDICAL ASSOCIATION JOURNAL

Vol. 71, December, 1954

* Proteinuria and malignant hypertension. Y. Piette and A. C. Corcoran.—p. 542.

Proteinuria and Malignant Hypertension. In one hundred cases of malignant hypertension, mean protein excretion in the urine was found to be 2.3 gm. per 24 hr. with a range of 0.0 to 21 gm. The proteinuria of a group of ninety patients varied with the blood pressure. The association was verified in individual patients and indicates that arterial pressure as such is one determinant of proteinuria in malignant hypertension. The variability of proteinuria and its association with arterial pressure suggest that intraglomerular pressure will, at a given degree of structural damage, determine the extent of protein leak, possibly by physical distension of glomerular capillaries. The significance of proteinuria in the diagnosis of malignant hypertension is shown by its occurrence (output greater than −0.2 gm. per 24 hr.) in all of the seventy-nine patients.

CHRONICLE OF THE WORLD HEALTH ORGANIZATION

Vol. 8, November, 1954

* Nutrition in Latin America and South and East Asia.—p. 317.

Nutrition in Latin America and Asia. The problem of protein malnutrition and endemic goiter in Latin America and in South and East Asia is discussed. In Latin America, the low consumption of protein-rich foods is due to insufficient production and high cost. In some areas, the protein deficiency is only part of a general insufficiency of calories and essential nutrients. Infants' diets after weaning tend to be deficient in both quantity and quality. Treatment is based on milk—in some cases acidified milk. It is suggested that treatment should be based on natural foods rather than pharmaceutical preparations, although the administration of vitamins A and D and ascorbic acid is advisable when there are signs of deficiency of these vitamins. Endemic goiter is present in more than 50 per cent of the population of certain areas in Latin America. Combating the condition begins with estimating the physiologic requirements for iodine. The best method of prevention is the consumption of artificially iodized salt, and in any country in which endemic goiter is a public health problem, legislative provision should be made for the compulsory iodization of salt. Protein malnutrition is also an important problem in many countries of South and East Asia, especially in children of the weaning and post-weaning ages. In general, children are fed rice gruel when they are weaned, and no particular attention is paid to providing a proper diet.

FOOD RESEARCH

Vol. 19, September-October, 1954

* The control of bacteria in chicken salad. I. *Micrococcus pyogenes* var. *aureus*. H. H. Weiser, A. R. Winter, and M. N. Lewis.—p. 465.
* The effect of several antibiotics on certain spore-forming organisms involved in food spoilage. O. W. Kaufman, Z. J. Ordal, and H. M. El-Bisi. —p. 483.
* Pectic constituents in ripe and unripe fruit. R. M. McCready and E. A. McComb.—p. 530.

Control of Bacteria in Chicken Salad. These studies indicate that cooked and boned chicken should be refrigerated at once in shallow pans at a temperature no higher than 45°F. As soon as it is made into chicken salad, the salad should be refrigerated in a similar manner until served. *Micrococcus pyogenes* var. *aureus* grows readily in diced chicken held at 70° to 80°F. Chicken salad, as prepared in these studies, had a *p*H of 5.5 to 5.7. This acidity retards the growth of micrococcal bacteria, as well as the vinegar which is a commonly used ingredient. About 24 hr. were required for 30-lb. cans of chicken salad to cool below the danger zone (48°F.) when moved from a kitchen at 79°F. to a refrigerator at 47°F. Only about 3 hr. were required for chicken salad in shallow pans to cool below the danger zone under the same conditions.

Effect of Antibiotics on Spore-Forming Organisms. Because of the limitations in the thermal processing of both acid and low acid foods, many antibacterial agents have been investigated in an attempt to find some which might destroy or reduce the thermal resistance of the spores and thereby eliminate the need for severe heat treatment. This investigation was set up to screen nine antibiotics against five spore-forming organisms commonly involved in the spoilage of canned foods. Each antibiotic was tested against each organism. Under the conditions of the test all but one of the antibiotics were sporocidal for *B. stearothermophilus*. Two exerted some sporocidal action against *Cl. thermosaccharolyticum*, but none of the antibiotics was effective against *Cl. botulinum* or *Cl. sporogenes*.

Pectic Constituents in Fruit. Pectic substances were extracted by mild means from ripe and unripe Elberta peaches, Bartlett pears, and Fuerte avocados, precipitated with ethanol, and characterized by analysis. Peach and pear pectin from both ripe and unripe fruits had unusually high acetyl contents of 3.0 and 3.5 per cent, respectively. The degree of esterification of the pectin with methyl ester groups was above 86 per cent in the unripe fruits but dropped to below 40 per cent after the pears and avocados ripened and the molecular sizes of all of the pectins decreased. No pectin-degrading polygalacturonase activity could be demonstrated in the unripe fruits, but ripe pears and avocados showed activities of 0.001 and 0.0035 millimole of bonds split per hour per gram of fruit, respectively. These results suggest that, in the fruits studies, pectic enzymes come in contact with the pectic substances during ripening and hydrolyze them to materials of lowered molecular sizes. The degraded materials are then less effective in maintaining firm structures in fruits and less important in contributing to the consistency of processed foods.

FOOD TECHNOLOGY

Vol. 8, December, 1954

* Mineral nutrition—the role of trace elements. C. A. Elvehjem.—p. 531.

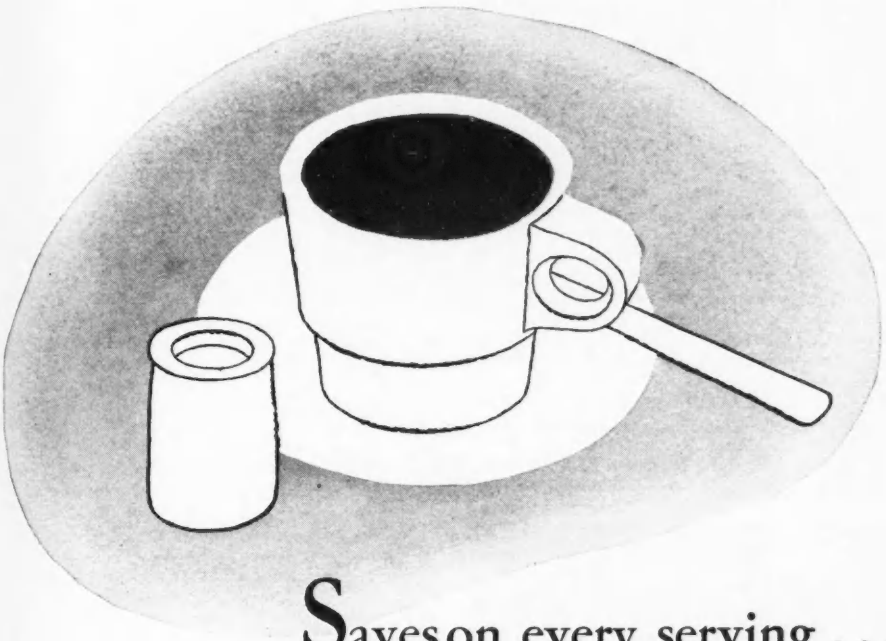
The use of ionizing radiations in the eradication of insects in packaged military rations. B. E. Proctor, E. E. Lockhart, S. A. Goldblith, A. V. Grundy, G. E. Tripp, M. Karel, and R. C. Brogle.—p. 536.

* Recent advances concerning the stability of foods. W. O. Lundberg and J. R. Chipault.—p. 541.
* Factors affecting the quality of pre-peeled potatoes. E. E. Anderson, W. B. Esselen, and C. R. Fellers. —p. 569.

Consistency of pastes and puree from Pearson and San Marzano tomatoes. B. S. Luh, W. H. Dempsey, and S. Leonard—p. 576.

Consumer evaluation of the flavor of angel cakes prepared from yeast-fermented and enzyme-treated dried albumen.—A. F. Carlin, J. C. Ayres, and P. G. Homeyer.—p. 580.

Trace Elements in Mineral Nutrition. Of the twenty or so mineral elements which appear commonly in foods in trace amounts or in amounts less than 0.005 per cent, eight may be listed as important to animal life—copper, cobalt, fluorine, iodine, iron, manganese, molybdenum, and zinc. Historical background of the work leading to the recognition of these minerals



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as essential nutrients, some of the newer developments, and the present-day significance of these mineral elements are briefly discussed. The author concludes that there is little likelihood of a deficiency of the trace elements, except perhaps the so-called critical trace elements, iron and iodine, and these can be added without much difficulty if a philosophy of food fortification is agreed upon. There is little difficulty regarding the addition of mineral elements, since the simple salts are all available except in the case of cobalt, which needs to be added as vitamin B_{12}. The effect of the trace elements on each other and on other essential nutrients is also mentioned; they should not interfere with each other. Finally, the author warns that we must object to the extravagant claims made for trace elements. They are not a cure-all.

Advances Concerning the Stability of Foods. A few of the findings in recent years that have a direct or indirect bearing on several types of stability problems are reviewed. In its broadest sense, stability in foods means an ability to withstand changes in various perceptible and physiologic properties, including odor, flavor, appearance, texture, and nutritive value. In this paper, special emphasis is given to the stability of the fat components of foods. The most troublesome form of oxidative deterioration in fats is so-called common oxidative rancidity which occurs typically in such fat products as lard and shortenings, but occurs also under some circumstances in almost any type of food which contains any appreciable amount of fat. It has been found recently that oxidative deterioration of lipid materials is responsible for off-flavors and odors in an ever-increasing circle of low-fat foods. This oxidative rancidity is important not only because of the objectionable flavor and odor but also from the standpoint of its harmful nutritional and physiologic effects. With many food products, the problems of oxidative rancidity may be met, at least partly, by various processing and packaging techniques. By minimizing or preventing contact with atmospheric oxygen, by preventing the introduction of, or eliminating positive catalysts, or by altering the chemical character of the fat, oxidation can be retarded. The authors also briefly describe some of the recent developments pertaining to browning reactions, radiation sterilization of foods, and antibiotics in food preservation.

Factors Affecting Pre-Peeled Potatoes. When packed in polyethylene bags and stored at temperatures of 32° to 40°F., pre-peeled potatoes, either whole or French fried, will have a storage life of approximately three weeks if pretreated by immersion for 15 seconds in an aqueous solution of sodium bisulfite calculated to contain 10,000 p.p.m. sulphur dioxide. Longer immersions in solutions containing less sodium dioxide, accomplished the same results. Little or no difference was found in the storage life at 35°F. of different varieties of potatoes or of the same variety grown in different locales after treatment with recommended sulphite dipping solutions. Net result of air drying sulphited pre-peeled potatoes before packaging resulted in a shorter shelf life than in comparable potatoes packaged after only a 15-second drainage period. None of the chelating agents, organic acids, reducing or antimicrobial compounds evaluated yielded shelf lives for pre-peeled potatoes that compared favorably with those obtained from the sulphite treatment. No success was obtained in attempts to develop an antidarkening treatment which, in combination with antimicrobiologic agents, might permit sale of pre-peeled potatoes at room temperature. Blanching studies on selected, medium-sized whole potatoes indicated that about 10 min. in boiling water were required to destroy all enzymatic activity and resultant discoloration; this procedure is not considered economically feasible. After eight days' storage at 35°F., the recommended dipping procedure of 15 seconds in a solution containing 10,000 p.p.m. of sulphur dioxide was found to bring about 11 to 13 per cent loss in the thiamine content of whole pre-peeled potatoes and from 30 to 47 per cent loss in the French fries.

GASTROENTEROLOGY

Vol. 27, November, 1954

* Effects of adrenocorticotropic hormone (ACTH) and of cortisone on peptic ulcer. 1. Clinical review. D. J. Sandweiss.—p. 604.

* Effects of adrenocorticotropic hormone (ACTH) and of cortisone on peptic ulcer. 2. Experimental studies on Mann-Williamson dogs. D. J. Sandweiss, S. R. Scheinberg, and H. C. Saltzstein.—p. 617.

The inhibition of the proteolytic action of pepsin by sulfate-containing polysaccharides. S. Levey and S. Sheinfield.—p. 625.

Effect of ACTH and Cortisone on Ulcer. The fact that ACTH and cortisone may initiate new ulcers or reactivate pre-existing ulcers has been reported frequently. Therefore, the question arises as to whether a pre-existing ulcer is a contraindication to the use of ACTH and cortisone. After reviewing the literature, the author formulated the opinion that if great benefits are expected and if there is a definite indication for steroid therapy, a pre-existing peptic ulcer is not an overriding contraindication. Acute ulcers, perforation, hemorrhage, and even fatalities have occurred in patients with and without histories of ulcer. Because of these complications, extreme caution is advised in the administration of ACTH and cortisone.

Postoperative Effects of ACTH and Cortisone. Experimental studies were done on the Mann-Williamson ulcer in dogs to determine the side effects of ACTH and cortisone. No deleterious effects were noted. The results seemed to indicate that ACTH had a beneficial effect on both postoperative survival time and the incidence of ulcer. With cortisone, however, a beneficial effect was noted only in the postoperative survival time. These results indicate that future investigation of the relation of certain hormones to the occurrence of peptic ulcer might prove valuable.

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY

Vol. 2, December 8, 1954

* Radiation sterilization of foods.—p. 1260.

* Potato composition, survey of major and minor sugar and starch components of white potato. S. Schwimmer, A. Bevenue, W. J. Weston, and A. L. Potter.—p. 1284.

Radiation Sterilization of Foods. The largest single problem to be surmounted before radiation techniques can be used in food processing is the production of undesirable side reactions which result in off-flavor and off-odor and other properties which detract from consumer acceptability. At present, three potential methods have been developed for reducing or offsetting undesirable side reactions: irradiation in the frozen state; irradiation in an inert atmosphere, devoid of oxygen; and addition of free radical acceptors. An application of radiation sterilization which appears possible soon is the use of relatively low energy electrons for the surface sterilization of foods to extend shelf life. Other possible applications include the eradication of insect infestation from grains and increasing the storage life of potatoes.

Potato Composition. Quantitative analysis and qualitative paper chromatography of the ion-free, alcohol-soluble sugars of plants have confirmed the fact that sucrose, fructose, and glucose comprise the major sugars of the white potato. The generally accepted pattern of sugar change of potatoes stored at various temperatures was also confirmed, and it was found that fructose, of the three major sugars, seemed to be most responsive to temperature changes. Neither the amylose-amylopectin ratio nor the phosphorous content of the starches isolated from the potatoes was affected by storage time and temperature. A study of various starch dispersion procedures has defined optimum conditions of solubilization of potato starch for starch-iodine "blue value" determinations.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 156, November 27, 1954

* Sodium-restricted diets. Council on Foods and Nutrition.—p. 1252.

Sodium restriction. Editorials and Comments.—p. 1254.

Vol. 156, December 18, 1954

* Nutrient content of acerola, a rich source of vitamin C. Council on Foods and Nutrition. P. H. Derse and C. A. Elvehjem.—p. 1501.

Vol. 156, December 25, 1954

A renaissance of the control of diabetes. Editorials and Comments. E. P. Joslin.—p. 1584.

* Antioxidants in food. Foreign Letters.—p. 1625.

Sodium-Restricted Diets. Complications of sodium restriction and contraindications to its use are discussed in this article, the final in a series of three sections of a report on sodium-restricted diets. It is pointed out that diets that are severely restricted in sodium may be inadequate in other essential nutrients, especially protein of high biologic value or the B-vitamins. These reductions may be unimportant if the restricted diet is not continued for long periods. If it is to

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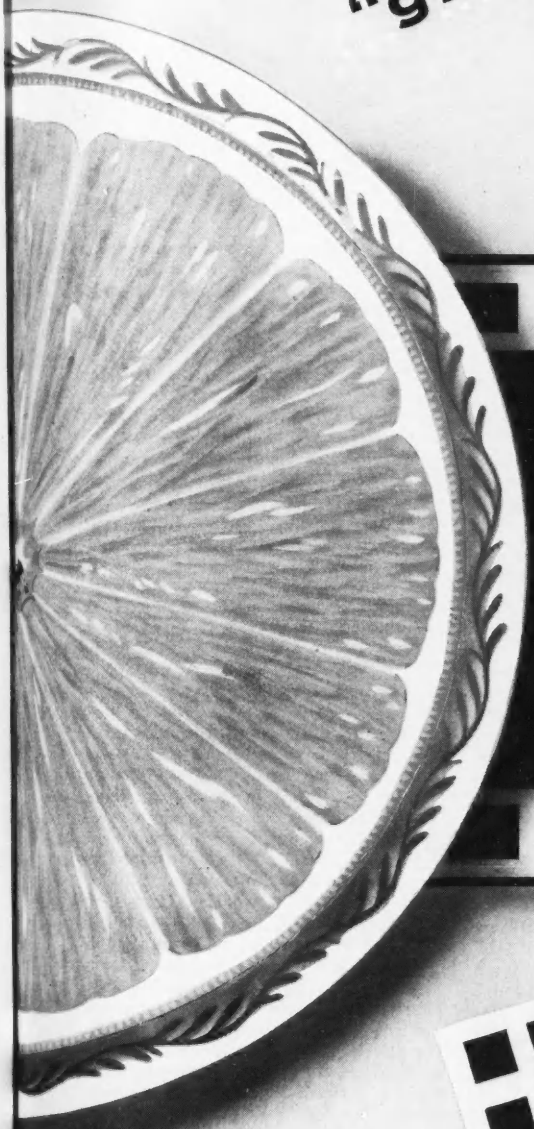

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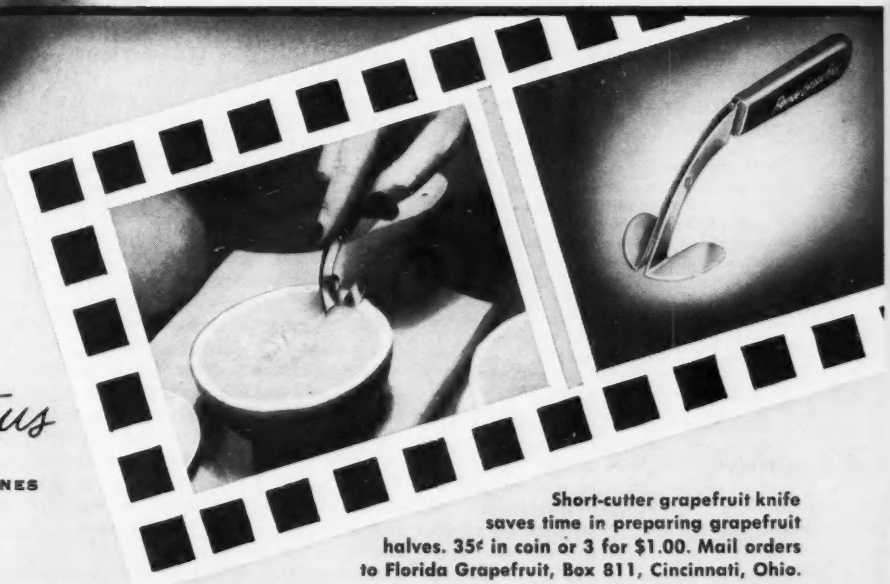

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continue for a long time, the physician must assess the nutritional adequacy of the diet and supplement it with the deficient nutrients. The most important hazard, possibly, of a sodium-restricted diet is the "sodium-depletion" or "low-sodium" syndrome. Although this may occur, it does not contraindicate the use of a sodium-restricted diet when suitable, but it is important that the patients be watched carefully for evidences of sodium depletion. A study of patients with cirrhosis of the liver who are forming ascites and edema and who are characteristically depleted of protein indicates that a sodium-restricted diet can halt the fluid accumulation and that a positive nitrogen balance will be continued. Thus, sodium restriction does not adversely influence their ability to build body protein.

Ascorbic Acid Content of Acerola. Acerola fruit, the "West Indian cherry," is reported to be one of the richest natural sources of ascorbic acid. Values obtained have averaged up to 2000 mg. per 100 gm. juice or fruit. The fruit is expected to become commercially important as an enriching agent for fruit products low in ascorbic acid. Proximate mineral and vitamin analyses of acerola were performed, the results of which are listed.

Antioxidants in Food. In England, the Food Standards Committee of the Ministry of Food has recommended that antioxidants should not be added to any foods other than to edible oils and fats, whether hardened or not; vitamin oils and concentrates and products consisting essentially of fat, such as margarine or shredded suet but not including butter; essential oils, including their flavoring constituents, isolates, and concentrates, but not flavoring essences. It is recommended that official approval be restricted to propyl gallate, octyl gallate, dodecyl gallate, and butylated hydroxyanisole and that specifications as to the purity of these antioxidants should be prescribed. The committee does not consider it necessary or desirable to extend the use of antixodants to any other classes of foods.

THE JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 211, December, 1954

- The conversion of uric acid to allantoin in the normal and gouty human. J. A. Buzard, C. Bishop, and J. H. Talbott.—p. 559.
- C^{14} studies in carbohydrate metabolism. I. The oxidation of glucose in normal human subjects. N. Baker, W. W. Shreeve, R. A. Shipley, G. E. Incefy, and M. Miller.—p. 575.
- The amino acid requirements of man. VII. General procedures; the tryptophan requirements. W. C. Rose, G. F. Lambert, and M. J. Coon.—p. 815.

The free amino acids of human blood plasma. W. H. Stein and S. Moore.—p. 915.

Conversion of Uric Acid to Allantoin in Gout. It has been demonstrated in one normal and one gouty human subject that there is no quantitatively significant conversion of injected uric acid to urinary allantoin. The findings strongly suggest that uricolysis does not occur in the normal human being, and that, if uricolysis does occur in a patient with gout, allantoin is of no significance. No attempt was made to determine other sources of the urinary allantoin, but it seems likely that ingestion of preformed allantoin may account for it.

Carbohydrate Metabolism. Four normal human subjects were given a single injection of glucose-C^{14}, following which serial samples of blood and respiratory carbon dioxide were collected. From the specific activity determinations of blood glucose-C^{14} and respiratory $C^{14}O_2$, an attempt was made to approximate the size, volume of distribution, and fractional rate of turnover of the glucose pool. The mean pool size was 0.15 gm. glucose per kilogram body weight distributed in a volume equivalent to 17 per cent of the body weight. An average of 0.69 per cent of the pool was turned over each minute. An expression was derived for approximating the relative contribution of glucose to expired carbon dioxide following a single injection of glucose-C^{14}. The mean value determined at different times between 1 and 6 hr. after the injection was 21 per cent. This represented an average of 38 mg. glucose per hour per kilogram body weight oxidized to carbon dioxide. It was further calculated that the amount of glucose oxidized to carbon dioxide accounted for approximately 60 per cent of the glucose removed from the body pool during a given time interval. It seemed likely that the C^{14} which was transported from glucose to carbon dioxide during the experiment had traversed pools having rapid turnover times.

Amino Acid Requirements of Man. Three quantitative experiments were conducted on normal young men to establish the minimal L-tryptophan requirements as measured by the maintenance of positive nitrogen balance. The results show that the three subjects required 0.15, 0.15, and 0.25 gm., respectively. Fifteen other young men were maintained on a daily intake of 0.20 gm. L-tryptophan, but no attempt was made to determine their exact minimal needs. No correlation was observed between the tryptophan requirements of the subjects and their body weights, body surfaces, or creatinine output. It is proposed as a precautionary measure that the highest observed value, 0.25 gm., be designated tentatively as the minimal daily L-tryptophan requirement. Since the possibility cannot be excluded that an occasional individual may require even more, allowance should be made for this contingency in formulating human diets designed to exclude amino acid deficiencies. At present, 0.50 gm. L-tryptophan may be regarded as a safe daily intake. Subsequent experience may allow this figure to be lowered. However, a safe intake should not be confused with an optimal intake, which undoubtedly is still higher, but for which no direct measurement is available. Two experiments in which L-tryptophan was replaced by the racemic amino acid indicated that little, if any, of the D isomer is utilized by man.

JOURNAL OF HOME ECONOMICS

Vol. 46, December, 1954

- Poor food habits are everybody's concern. D. Spurling, M. Krause, N. Callaghan, and R. L. Huenemann.—p. 713.
- Between-meal feedings for preschool children. N. Munro.—p. 724.
- Weight control program includes husbands and wives. M. Barclay.—p. 730.
- Ascorbic acid content of frozen Brussels sprouts. I. S. Fagerson, E. E. Anderson, and K. M. Hayes. —p. 731.

Poor Food Habits. A survey taken by the social welfare-public health, school lunch and institutions, and foods and nutrition sections of the California Home Economics Association indicated that of approximately 10,000 high school students queried, roughly one-third "never" or "sometimes" ate breakfast, while two-thirds "most always" did. The most frequently mentioned reason for omitting breakfast was "not enough time." The authors believe that the problem should be correctly identified and analyzed: Is breakfast really the meal requiring emphasis in this situation? If a breakfast makes a significant contribution of nutrients to the total day's intake and if it is relatively high in protein, it would be satisfactory, regardless of whether it fits conventional breakfast patterns. The question of quantity of breakfast to recommend must likewise be viewed in relation to total food intake. It may be more practical to suggest augmenting a small breakfast with a wholesome snack at mid-morning than to try to push 1200 calories down an excited youngster in a rush to get to school. The basic considerations in planning a breakfast are: (a) Is breakfast really a problem with the people with whom we are working? (b) If so, what shall we recommend in regard to quality and quantity of breakfasts, in view of their total way of life?

Between-Meal Feedings for Preschool Children. A recent study shows that small eaters in the Montana State University Nursery School continued to eat approximately the same amount of lunch regardless of whether they were served a snack, although they ate more of the snack if it were served earlier in the morning and their total food intake was thus increased by the larger snack eaten. The snacks were varied as to content and time of serving in ten different ways. The effects of "no" snacks, a variety of nourishing snacks, high-fat snacks, high-protein snacks, high-carbohydrate snacks, snacks consisting of candy, cookies, and pop, and snacks of sandwiches and milk were determined. There was considerable variation in the amount of food eaten by all of the children. Those with the more vigorous appetites showed more variation in the amount they ate from day to day. It would appear logical, the author states, to serve snacks to preschool children early, permitting them to eat what they require, thus avoiding excessive hunger and undue conflict concerning food. The importance of eating at a particular time at home is decreased, for the child will have another chance to eat at snack time. If the mother wants to increase the

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amount a child eats at mealtime, she may concentrate her efforts on making the food more appealing to the child and providing a more pleasant emotional environment which will enable him to enjoy food.

Weight Control Program. An average of 125 persons (employed husbands and wives) attended a series of five weight control nutrition talks sponsored by the Hillsborough County (Florida) Nutrition Committee. Throughout the series, the physicians, nutritionists, and food demonstrators emphasized the importance of the influence of food intake on weight, that fad diets are not recommended, and that a knowledge of food values is helpful. Questionnaires taken at each meeting showed that 90 per cent of the audience liked the combination of medical and nutrition talks and food demonstrations.

Ascorbic Acid of Frozen Brussels Sprouts. A study of frozen Brussels sprouts reveals that fifteen of the more widely distributed brands, in servings of one cup, provide the daily allowance of ascorbic acid (70 mg.) recommended by the National Research Council. A one-cup serving of one brand can even provide 160 per cent of the day's allowance. The authors state that consumption of Brussels sprouts has been steadily increasing primarily because of the availability of the frozen product. They say per capita consumption has increased about 3000 per cent in fifteen years.

THE JOURNAL OF NUTRITION

Vol. 54, November 10, 1954

* Effects of a fat-free diet on growing male rats with special reference to the endocrine system. T. C. Panos and J. S. Finerty.—p. 315.
* Utilization of amino acids from foods by the rat. III. Methionine. B. S. Schweigert and B. T. Guthneck.—p. 333.
* Nutritive value of the diets of Iowa school children. E. S. Eppright, V. D. Sidwell, and P. P. Swanson.—p. 371.
* Variability in the measure of total ascorbic acid utilization by the human. K. H. Fisher and M. L. Dodds.—p. 389.
* Apparent digestibility of dietary protein as a function of protein level. E. W. Crampton and B. E. Rutherford.—p. 445.

Effects of a Fat-Free Diet on Growing Male Rats. Thirty male Holtzman rats were fed, from the time of weaning and for a period of twenty weeks, a synthetic diet completely devoid of fat. The percentage composition of the fat-free ration was: fat-free, vitamin-free casein, 18; sucrose, 76; salts, 4; and cellulose, 2. Vitamins were added as follows: thiamine chloride, riboflavin, pyridoxine, calcium pantothenate, crystalline vitamin A acetate, crystalline vitamin D_2, nicotinic acid, para-aminobenzoic acid, biotin, inositol, folic acid, B_{12} with mannitol, menadione, and alpha-tocopherol. Eighteen animals maintained under identical conditions were fed Purina Laboratory chow to serve as controls. Findings in the rats fed fat-free diets were: impaired growth, the body weight attained being 66 per cent that of the controls; typical skin lesions on tail, feet, and back, beginning after nine weeks on the deficient diet; and increased oxygen consumption demonstrable as early as two weeks. Autopsy revealed the brain, adrenals, liver, heart, and kidneys to be significantly heavier than in controls, but the thyroid smaller. Microscopic study showed inter-tubular accumulations of blood in the kidneys, characteristic thickening of the epidermis, and accumulation of fatty droplets around hepatic veins. The seminiferous tubules of all deficient rats showed signs of degeneration consisting of varying degrees of inter-cellular and intra-cellular vacuolations and reduction in spermatids and mature spermatozoa. Male rats maintained on a fat-free diet for periods of only two and five weeks showed similar changes from controls, indicating that definite effects of fat deficiency are present long before the appearance of skin lesions.

Utilization of Amino Acids. The percentage of methionine utilized by the weanling rat and protein-depleted rat from various protein preparations, cereals, legume and animal protein foods which supplemented a diet limited only in methionine has been studied. On the basis of the rate of gain and food efficiency data, 217 mg. methionine per 100 gm. ration met the requirement for the weanling rat. The basal ration was designed to be adequate in cystine, in methyl donors, and in B-vitamins involved in one carbon metabolism; the only obligatory role of dietary methionine was for tissue (protein) synthesis. The methionine requirement for the protein-depleted rat approximated 177 mg. L-methionine per 100 gm. ration. The D isomer of DL-methionine was completely utilized by both weanling rats and protein-depleted adult rats. The percentage of methionine utilized from various foods ranged from 44 for unheated soybean flakes to 79 for beef round. Percentage of ingested methionine that was excreted ranged from 1.5 for beef rib to 19.4 for rolled oats. Results suggest that significant amounts of methionine were metabolized and not utilized for tissue synthesis, or excreted in certain cases.

Nutritive Value of the Children's Diets. Mean daily intakes of food energy and ten nutrients have been estimated from seven-day dietary records for Iowa school children at successive ages from six through eighteen. Except for calcium, boys tended to have larger mean intakes of food-energy and nutrients at successive years. The intakes of girls six to twelve tended to increase irregularly, but beyond twelve food-energy and nutrient consumption remained the same or decreased, except for ascorbic acid. At twelve, trends in nutrient intake of girls changed markedly, and at sixteen negative deviations from the Recommended Dietary Allowances were especially noticeable. The mean daily nutritive value of the boys' diets at most ages and of girls six through twelve years approximated or exceeded the allowances, except in calcium. After twelve, girls tended to have diets below the allowances in most nutrients, but the deviations were greatest in iron and calcium. In each age-sex group approximately 12, 42, and 46 per cent of the total food-energy value of the diet was obtained from protein, fat, and carbohydrate, respectively. Mean daily protein intake during school age decreased from 2.7 to 1.1 gm. per kilogram body weight for girls and from 2.9 to 1.5 for boys. Mean daily intakes of thiamine, riboflavin, and niacin were related to mean daily intake of protein according to certain mathematical factors. These observations of trends in nutrient consumption have focused attention particularly on the disparity between the apparent calcium intake of Iowa school children and their estimated needs.

Variability in Ascorbic Acid Utilization. The carry-over effect of previous intake of total ascorbic acid on subsequent data and the effect of the same amount of a test dose of ascorbic acid given either at a single time or divided by an interval of time have been studied. The sensitivity of blood plasma and urine measurements as means to differentiate changes in ascorbic acid intake has also been studied. Total ascorbic acid of the blood plasma and of 24-hr. urine were measured first for a period of thirty-seven days, which was followed immediately by a twenty-three day period. It was concluded that the carry-over effect of both high and low intakes of total ascorbic acid is still evident in the blood plasma for at least twenty-three days after transfer to a new intake level. The excretion of total urinary ascorbic acid appears to adjust more quickly than does the blood plasma level. There were no significant differences in blood plasma or urinary total ascorbic acid values when the same amount of the vitamin, either 75 or 150 mg., was ingested as a single or divided intake. Blood plasma levels and 24-hr. urine returns of total ascorbic acid are demonstrated to differentiate between intakes of 60 and 75 mg. for eight subjects at each level. Differentiation is suggested by as few as three subjects at each level.

Digestibility of Dietary Protein. Coefficients of apparent digestibility of protein for rats were obtained on a wide range of combinations of wheat, methocel, egg, and cheese. Partial regression and multiple correlation analysis of the data revealed that the greatest portion of the variation in the protein digestibility coefficient is accounted for by the percentage of protein in the diet. Therefore, although different types of foods frequently have characteristic protein levels, any relation between type of food and the apparent digestibility of its protein is coincidental. Adjustment of the total fecal protein to average dry matter intake revealed that there was a small increase in fecal protein with increasing percentage of dietary protein. It was postulated that this increase was due to bacterial protein, and that the true digestibility of the protein in all of these diets was 100 per cent. Thus, differences in apparent digestibility of protein of different types of foods are not primarily due to inherent differences in the true digestibility of their protein. Rather, they are mainly due to the effect of relatively constant metabolic fecal nitrogen when the proportion of the

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protein intake which "disappears" between ingestion and fecal output is calculated.

THE JOURNAL OF PEDIATRICS

Vol. 43, December, 1954

* The influence of nutrition on the growth rate of Southern Indian infants born in Singapore. J. Millis.—p. 697.

Nutrition and Growth of Southern Indian Infants. Fifty male and fifty-six female Southern Indian infants of lower income levels in Singapore were observed for one year. The infants who were breast fed longest showed a more rapid gain in weight during the first six to eight months, but this advantage was lost by the end of the year. Generally, infants who were breast fed for longer than twenty-four weeks had a higher medical rating and a lower incidence of illness than infants weaned earlier. Variation in housing standards made no detectable difference to health or progress of the infants. The inadequacies of the weaning diet and the low standard of hygiene, together with the overcrowded living conditions, have had a detrimental effect on the health of the infants as shown by slow gain of weight and high incidence of illness.

NEW YORK STATE JOURNAL OF MEDICINE

Vol. 55, January 1, 1955

* The round-number barrier in weight reduction. L. Klotkin.—p. 98.

Round-Number Barrier in Weight Reduction. For many years the etiology of obesity has been a matter of controversy. The overeating in obesity is no longer controversial, even though neurologic, endocrine, and metabolic factors have been incriminated as the basis of overeating. It is held now by many that emotional factors are the source of overeating. It has been observed that the obese patient will terminate treatment at a "round number." For instance, should the desired weight be 178 lb., treatment may reach termination at 200 lb. This "round number barrier" may provide another link in the evidence pointing to the unconscious factors in the etiology of obesity.

NUTRITION REVIEWS

Vol. 12, December, 1954

* Early experiences with iron and copper—a retrospect. J. Waddell.—p. 353.

Historical Retrospect on Iron and Copper. The author describes various experiments involved in the study of the development of an anemia in young animals restricted to a diet of milk and the prevention and cure of this anemia by various supplements. Early study established that young rabbits became anemic when made to subsist on a diet of milk and that the addition of inorganic iron, in the form of ferric oxide, to the diet did not prevent the anemia. Further study indicated that an "unidentified factor" was needed to increase the hemoglobin level. This factor turned out to be copper. Tests with copper demonstrated marked stimulation of hemoglobin synthesis when given with iron on the milk diet. Additional studies to see if any other element would function to supplement iron in curing the nutritional anemia produced by the milk diet showed that none could replace copper.

PSYCHOSOMATIC MEDICINE

Vol. 16, November–December, 1954

* Note on the gastric peristaltic rate observed radiologically in a group of mental patients. H. Jungmann and P. Venning.—p. 502.

Peristalsis in Mental Patients. The rate and variability of peristalsis of a group of mental patients was studied. The method of study was an X-ray examination of each person after a barium meal. The conclusion was drawn that the rate of gastric peristalsis of the mental patients was no different from that of the normal persons examined.

PUBLIC HEALTH REPORTS

Vol. 69, December, 1954

* Survival of enteric organisms in shellfish. C. B. Kelly and W. Arcisz.—p. 1205.

Enteric Organisms in Shellfish. When shell oysters were stored for twenty-two days, under conditions similar to those normally occurring between the point of harvesting and time of consumption, the numbers of *E. coli* decreased throughout the entire storage period. Little, if any, reduction in *S. schottmuelleri* was observed. When storage was continued for forty-nine days, the reduction in the numbers of the two test organisms was more nearly parallel, particularly after the fifth day of storage. Both Salmonella organisms and *E. coli* were recovered in significant numbers at the end of storage. Little, if any, deterioration of the oysters was observed, although some dehydration of the meats did occur, owing to storage under dry conditions. The oysters were still in salable condition at the end of both storage periods. The reduction of both organisms in stored soft clams proceeded in a similar fashion. The rate of reduction at a moderate temperature (66°F.) was generally similar to that at refrigeration temperature (40°F.) during the same period of storage. There was little evidence of multiplication of either *E. coli* or *S. schottmuelleri* in animals that could be considered in marketable condition. Increase in both organisms, on some occasions in the same lot of shellfish, occurred on prolonged storage.

SCIENCE

Vol. 120, November 26, 1954

* Relationship of dental cavities to general health. J. H. Manhold and C. E. Izard.—p. 892.
* Recovery from the failure to eat produced by hypothalamic lesions. P. Teitelbaum and E. Stellar.—p. 894.

Relationship of Dental Cavities to General Health. In recent years, dentistry, as well as other branches of medical science, has postulated that certain chronic illnesses affect dental conditions, and conversely. The present

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As a result of the nationwide enrichment of bread, the average American consumes notably more thiamine, riboflavin, niacin, and iron.[1] Enriched bread has thus served as a vigilant guardian against beriberi, ariboflavinosis, pellagra, and iron-deficiency disease.[2]

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Enriched bread also supplies important amounts of high-grade protein, calcium, and nutrient energy. Its protein, comprising flour protein and milk protein, contributes significantly to sound growth and tissue maintenance.

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study presents empirical evidence of a relationship between general health, as measured by frequency of medical complaints, and oral pathology measured by a DMF (decayed, missing, and filled teeth) rating. Thus dental caries, as well as other somatic complaints, should be considered in any appraisal that attaches a general term, such as good, fair, or poor, to a person's condition of health.

Recovery of Appetite after Hypothalamic Injury. The same general course of recovery of eating behavior following lateral hypothalamic lesions was shown by fourteen recovered animals. After an initial period of complete refusal to eat, animals will accept only evaporated milk or, somewhat less readily, milk chocolate. Only later will they accept water, and after this they will eat regular laboratory food. Once rats recover the ability to eat postoperatively, they maintain the same intake of laboratory food and water as comparable normal animals and can regain and hold their pre-operative weights. The hypothesis is proposed that dietary fat may stimulate appetite in operated animals sooner and more readily than other foods.

SOUTHERN MEDICAL JOURNAL

Vol. 47, December, 1954

* Medical treatment of peptic ulcer. L. Martin.—p. 1184.
* Dietary needs and weeds in Louisiana. M. F. Gutelius.—p. 1196.

Treatment of Peptic Ulcer. The usual patient with a peptic ulcer is not concerned with theories of etiology. He has real pain, uncomfortable digestive symptoms, hemorrhage, or combinations of these and other molesting symptoms. If possible, he prefers that treatment be consonant with continuation of his activities. The relief from pain after therapeutic meals has been attested since the middle of the last century. Food selected as soft and smooth should produce less peri-ulcer irritation and less secretion of acid gastric juice. The relief from pain following oral ingestion of alkalies has been known equally long, and it further checks the digestive action of pepsin. The regimen advised is often as follows: meals consisting of soft foods at 5- or 6-hr. intervals, with milk and cream or milk plus some protein hydrolysate or olive oil midway between meals. Usually 15 cc. of an aluminum hydroxide preparation with added phosphorus is prescribed shortly after each of the six meals, at bedtime, and when the patient awakens during the night.

Children's Dietary Needs in the South. Observations in the pediatric clinics at Charity Hospital of Louisiana, New Orleans, indicate that a poor diet is eaten by many families, both Negro and white. The diets tend to be high in carbohydrates and low in protein, minerals, and vitamins when compared with recommended allowances. Records point to the popularity of certain foods, such as rice, beans, grits, and doughnuts. It is also demonstrable that meat, vegetables, and fruits are frequently absent from a day's meals, although most children get these foods at times. The average daily intake of milk for a child is frequently either too high or too low. The addition of a serving of collard greens and the substitution of 1 pt. skim milk for 8 oz. whole milk result in a fairly satisfactory diet without increasing the cost. The original "poor" diet would be considerably poorer if beans, an important source of all essential nutrients, especially protein and iron, were not so popular. A child who eats rice in preference to beans, for example, would have a much less satisfactory diet. Also a six-year-old who does not take 1600 calories daily would necessarily ingest less protein, minerals, and viamins. Fortunately, the enrichment of all wheat and corn is now compulsory in most of the South, adding considerably to the intake of iron, thiamine, riboflavin, and niacin.

TEXAS STATE JOURNAL OF MEDICINE

Vol. 50, December, 1954

* Fatality from parenteral protein administration. J. C. George.—p. 820.

Fatality from Parenteral Protein Administration. A case of fatal anaphylactic shock following administration of plasma hydrolysate (Travamin) is reported. Increasing reports of fatalities such as this lead to the conclusion that these substances cannot be used with complete impunity. It seems more judicious not to use this method of administration for persons able to take protein

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Scald milk, add butter, salt and SUCARYL; stir until butter is melted. Cool to lukewarm (70°—90°F.). Dissolve yeast in warm water; add to milk mixture. Add beaten eggs and flour; mix well. Spoon into greased 9-inch square cake pan. Let rise, covered, in warm place until double in bulk. Scatter chopped walnuts over top with sprinkling of powdered SUCARYL and cinnamon. Bake in hot oven, 400°F., 20 minutes. Makes 9 servings.

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Indeed, the stigmata of chronic undernutrition may be evident even before birth, when fetal bone and tooth impairment give telltale signs of poor mineral and vitamin intake by the mother. And the same dietary inadequacies may simultaneously take their maternal toll by precipitating such complications as eclampsia, vomiting, osteomalacia and premature labor.[3,4,5] The recommended diet of pregnancy and lactation, therefore, stresses *high calcium, high protein* and *low fat*[6]... requirements specifically fulfilled by cottage cheese.

The high protein diet, moreover, plays an important role in improving liver function,[7,8] and in significantly decreasing convalescence time following viral hepatitis.[9] In addition, neurologic and psychologic complications resulting from "undernutrition" are problems that confront pediatrician and geriatrician alike.[10,11,12]

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therapy orally or in those cases in which withholding protein for a few days would not seem to cause undue hazard to eventual recovery. Testing for sensitivity of patients receiving protein digest would be a worthwhile procedure.

ADULT LEADERSHIP

Vol. 3, January, 1955

* The incident process—learning by doing. P. Pigors and F. Pigors.—p. 5.

Learning by Doing. One of the best methods of group learning is "the incident process." Actually, this is a process of questioning. The steps are these: (a) given an incident from an actual case, the individual members of the group study and try to clarify for themselves the facts; (b) after asking himself questions, each member then proceeds to the fact-finding phase, where the whole group works on the problem together; (c) the members of the group find out, after getting the facts, what must be decided; (d) the members then spend some time writing and testing decisions (by writing them down, they discover that there still are many unanswered questions as well as how the group as a whole stands on the case); (e) then the group evaluates a whole series of actions, decisions, and consequences, and yet also generalizes on the situation. There are three principals in this type of discussion: the team leader, the director, and the observer-reporter. The article shows clearly the part they play in the group discussions and decisions and tells how, through this method of study, we can learn by doing, as members. The case that is used as an example is one of a labor-union problem with a foreman.

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AMERICAN RESTAURANT MAGAZINE

Vol. 39, January, 1955

Volume built on people—not dollars. G. L. Wenzel.—p. 44.

* Better planning for better food preparation and service. C. E. Blackburne.—p. 52.

Menu Planning for Mass Feeding. In planning the basic menu for an industrial food service, consideration must be given to the calories needed for the amount of work required of employees. Thus, the basic menu must emphasize high- or low-calorie foods, whichever type is required, and yet be nutritious and inexpensive. Tips on successful menu writing include: (a) plan the menu before you have eaten; (b) select a quiet place in which to do it; (c) prepare basic lists of best-selling meat entrées, secondary items, casserole dishes or paste combinations; (d) make a skeleton menu of the main items in the weekly menu to avoid repetition; (e) make a chart of the steam table, showing available space to keep foods hot; and (f) list all leftovers. Other suggestions to make menu writing easier are also presented.

AMERICAN SCHOOL FOOD SERVICE NEWS

Vol. 8, December, 1954

* Mobile service for small schools. R. M. Cutter.—p. 8.

Mobile Service for Small Schools. In New Hamsphire, new elementary schools have difficulty serving lunches, because the same room must be used for the physical education program in the morning, as the lunchroom at noon, and as a classroom in the afternoon. This means that the room is left dusty and too often filled with body odors in the morning. Also, there is the difficulty of putting up tables and chairs for lunch and then taking them down again in preparation for classes in the afternoon. To answer the problem, the school lunch people worked with a manufacturer and found that a portable cart to transport and serve the noon meal in the home classroom might solve the problem. The cart had to be inexpensive, if the schools could afford to buy it. A trial cart, made of galvanized iron, was designed and is now being tested in one school to determine any flaws before it is put into production. Shelves provide space for dishes, and drawers are used for flat and serving ware. A handle is provided which can be used during the serving of food as towel rack. The cart is described and illustrated in this article.

HOSPITALS

Vol. 29, January, 1955

* Equipment maintenance—let's take another look! A. Bannister.—p. 110.

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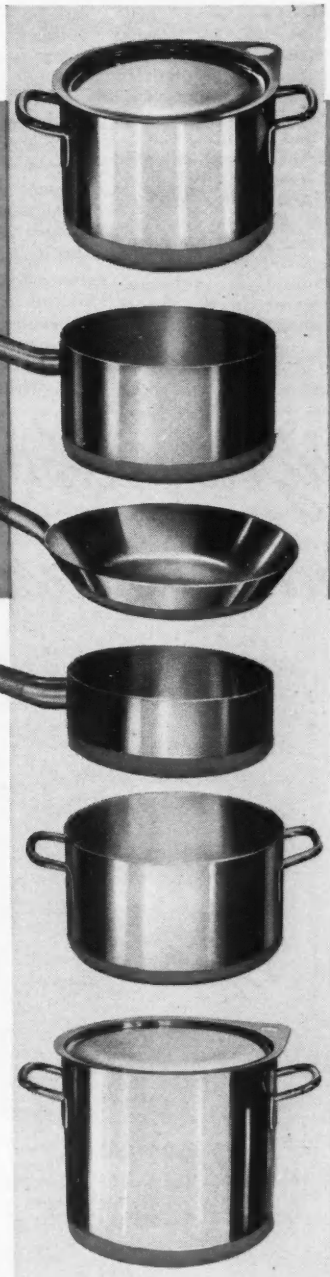

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Equipment Maintenance. A good maintenance program begins with good relationships between the dietary and engineering departments. The dietitian must understand the engineer's viewpoint and be prepared to cooperate with him. Before this understanding can be achieved, the dietitian and engineer must understand each others' departmental and interdepartmental responsibilities, including the confines and boundaries of each operation. The dietitian is responsible for the adequate training of dietary employees in the care and operation of equipment. She should promptly report needed equipment repairs to the chief engineer and should maintain a file of all dietary equipment with specific information on the serial number, manufacturer, date of purchase, and daily load. The engineering department assumes responsibility for the routine servicing of equipment and handles equipment breakdowns and replacement of parts. The engineer should provide adequate, qualified maintenance personnel for prompt servicing. The foreman or other responsible maintenance man should routinely check all dietary equipment. The chief engineer and chief dietitian should decide which maintenance duties the engineering department is unable to provide due to personnel limitations, inadequate facilities, or other reason and then request the administrator's permission to obtain these services from outside agencies.

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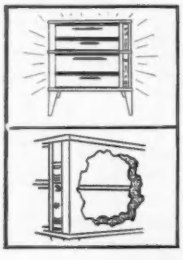

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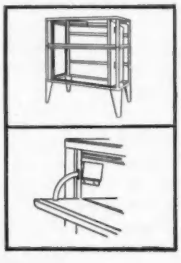

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INPLANT FOOD MANAGEMENT

Vol. 1, January, 1955

* What you should know about deep fat frying. N. I. Phillips.—p. 17.

Deep-Fat Frying. Modern deep-fat frying is a science. Scientifically, when used for cooking, fat is merely a medium to transfer heat by conduction, yet it is affected by the chemical changes within itself. We must select fat carefully, for the food cooked in it will absorb some of the fat; since the fat is also a food, it will contribute to the richness of the food fried in it. This absorption is never excessive if the proper fat is used and careful procedures are followed. Proper equipment must also be carefully selected. Experts say that 15 per cent of the fat should be replaced every day, but some operators believe that it should all be replaced. Since some fryers are more easily cleaned than others, this is one thing that should be considered in buying a fryer. This article contains useful information to aid in getting the most out of the deep-fat frying process. Included are sections on: (a) what you should know about fats and equipment; (b) a summary of pointers on deep-fat frying, which gives instructions on selecting a fat, care and selection of equipment, and the actual frying of foods; (c) time and temperatures for frying all types of food; (d) breadings and batter; and (e) recipes and tips on frying a number of entrées, vegetables, sea foods, and desserts.

INSTITUTIONAL FEEDING AND HOUSING

Vol. 4, January, 1955

Water softeners can cut your maintenance costs.—p. 17.

* Safety pays off in dollars.—p. 18.

How to improve your griddle cookery.—p. 20.

Safety Pays. Safety is one thing which does not show up until the lack of it causes an accident. Safety is important in a food establishment, and a walk through the place by the manager, using common sense and keeping safety in mind, can eliminate many hazards. A good starting point could be the sidewalk in front of a restaurant, making sure there are no bumps, cracks, or ridges where people entering, or just walking by, can trip. Entryways should not be cluttered with coat racks, penny scales, loose mats, and hard-to-operate doors. Once inside, patrons often find slippery floors, broken tables and chairs, cracked china, and bent silverware. All of these often unnoticed factors can cause serious accidents. Safety should apply to employees also, and, actually, by law an employer is required to provide employees with a safe place to work. Kitchen equipment should be kept in good working order, and safety devices should be installed on all equipment such as grinders, slicers, and tenderizers. Organization in the kitchen and working areas is very important. Poor lighting, unsturdy storage bins and racks, carelessly stacked boxes, cans, or packages, and poor organization in general might lead to costly accidents.

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INSTITUTIONS

Vol. 36, January, 1955

* Because they meet critical eyes.—p. 9.
* Food costs require daily attention to achieve control. L. W. Scott.—p. 22.
* To do or not to do—when caring for asphalt tile floor. J. W. Hillyard.—p. 40.
* Getting worker acceptance for new recipes, methods. M. K. Cranmore.—p. 86.
* Review causes of food toxemia. R. R. March. —p. 122.

Lessons in Grooming. The personal grooming of employees is one of the most important aspects of an institution's success, for the public judges critically an institution where the people who handle the food are not well groomed. Most successful establishments are very frank with the subject of grooming, and they teach their employees basic rules and regulations about good grooming. This article, the third in a series on grooming, cites a company which planned a course in good grooming. Prepared for use in both industry and in schools, this course has a pleasing and informal approach and can be used in training both men and women. The main subjects covered are: general fitness, body cleanliness, and care of facial skin, hands, hair, and clothes.

Daily Attention to Food Costs. This article deals with the issuing of food and control of its cost. One way in which a food service manager might control the issuance of supplies is to require those who take food out of the refrigerator to turn in a written record of the amount received each time. Another way is to use requisition forms. In doing this, the manager can also make up the food costs each day and keep a running inventory. There is a great difference of professional opinion on the subject of perpetual inventory. Some believe it is the only way to keep air-tight control of your food, while others believe that monthly inventory, especially in small units, is quite satisfactory. One problem that increases wastefulness and pushes food costs up is disorganized and poorly planned preparation. The food service manager should check to see that meals are being prepared according to standard recipes.

Caring for Asphalt Tile Floors. This article covers: the correct method to clean an asphalt tile floor, including choosing a cleaner; how to use a protective sealer; and the kind of wax to use. There are instructions on how to rewax an old floor and how to apply a slip-resistant wax. The upkeep of asphalt tile floors normally consists of daily sweeping with a soft cotton brush. Reconditioning of old floors that are damaged by softening and bleeding colors, drying, cracking, or curling, is also covered.

Worker Acceptance of New Recipes. Getting a standardized recipe program accepted and used by personnel in a food service unit is often difficult, since people seem to have an aversion to new ideas or procedures. This article presents ways in which the supervisor can obtain acceptance: (a) explain the purpose and aim of the long-range program of recipe standardization to employees long before it is put into effect; (b) encourage employees to make suggestions and actually participate in the program by sampling the recipes; (c) develop a feeling of responsibility, pride, and accomplishment as each recipe is perfected; (d) show appreciation for help contributed by employees and give credit where credit is due, in print. There are several ways to introduce standardized recipes. One of the most successful is on-the-job instruction. With this method, the recipe must be written clearly and simply, and the demonstration, or the procedure, must be clearly understood. Some organizations use the bulletin-type of presentation, and it is up to the head chef or food manager to see that personnel prepare the recipe correctly. After a recipe has been used for six months, each chef makes a report, telling of the results and popularity of the dish. Some institutions provide cooking classes for employees when new recipes are introduced.

Causes of Food Toxemia. Some of the common causes of food poisoning discussed in this article are: (a) sprays from fruit and vegetables; (b) antimony and cadmium poisoning from kitchen ware; (c) poisonous plants and animals; (d) mushrooms and mussels; and (e) infectious animals. An institution should take precautions against these different means of food poisoning. All fresh produce should be washed thoroughly before being served to eliminate residues from

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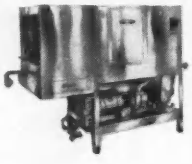

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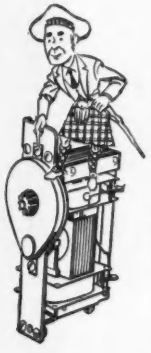

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...is one of the seven commonest danger signals that *may* mean cancer...but should *always* mean a visit to your doctor.

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American Cancer Society ®

sprays. Today, the use of aluminum and stainless steel instead of grey enamel ware and cadmium-plated food receptacles eliminates some danger from poisoning. Most poisonous plants and animals are usually eaten because of ignorance, and the commercial purveyor of foods is concerned about those in which one part is edible and another is not. Two foods known to be poisonous are the poisonous mushrooms and some types of mussels. Most states where these products are sold have strict supervision over them. The two groups of animals which contribute to human illness when eaten with our food are worms and protozoa. The worms found in this country are the tapeworm, the flukes, and the round worms, such as trichinae. There are also some foods to which a person may be hypersenitive. However, the food service operation has no control over this type of food illness.

PERSONNEL JOURNAL

Vol. 33, January, 1955

* Non-financial incentives. G. W. Wadsworth, Jr. —p. 286.

Non-Financial Incentives for Employees. Aside from a paycheck and various taken-for-granted benefits for employees, there should be other incentives to do a good job. The author believes that the most important non-financial incentive is a good day-to-day relationship between the boss and the worker, not the standard morale-builders, such as coffee bars, rest periods, company picnics, and even service pins and awards. The effective boss has good on-the-job personnel relationships and gets excellent output because he succeeds in appealing to the two beliefs which all human beings appear to have in common. The first is that, as individuals, we believe we are actuated only by the best and highest motives. The other is the belief that we have no essential shortcoming or fault which we cannot overcome, if we put our minds to it. If the supervisor, or boss, acts on these beliefs, he is more likely to get the cooperation needed for good production than if he approaches the problems with the old-fashioned idea of "I'm the boss." To improve production, personnel relationships of various groups should be evaluated to learn the supervisors' effectiveness.

PRACTICAL HOME ECONOMICS

Vol. 33, January, 1955

* The curriculum in school lunch. F. M. Moore and F. L. Boyd.—p. 18.
* School lunch layouts. M. Bloetjes and G. G. Zipfel.—p. 22.

School Lunch and the Curriculum. This article deals with the relatively new development of nutrition education in the school curriculum. Research about teaching and learning is first reviewed, followed by a discussion of methods of teaching nutrition in the school program, using the school lunch as an educational part of the curriculum. Problem-solving experiences in learning have proved more successful than subject-matter-centered methods. In other words, learning is actually a process of changing and improving the behavior and not just an accumulation of factual information. Students learning about nutrition must learn about the basic food groups. To teach them this, they must realize the relation between good health and vitality and must assume responsibility for improving their diets and attaining the goal of good health through nutrition.

School Lunch Layouts. This is a condensation of two talks given at the last convention of the American School Food Service Association by Dr. Mary Bloetjes of Florida State University and George G. Zipfel, manager of a food service equipment company. The speeches concern the principles of layouts, equipment placement, and use. Kitchen layout depends on the different food items purchased from purveyors that are necessary for the food service operation. These food items can be classified according to storage: refrigerated, frozen, or dry. In turn, these three types of storage are broken down into smaller classifications.

RESTAURANT MANAGEMENT

Vol. 75, December, 1954

* How to choose and arrange your deep fat fryers. A. W. Dana.—p. 30.
* For better sanitation . . . black light. J. Joseph. —p. 32.

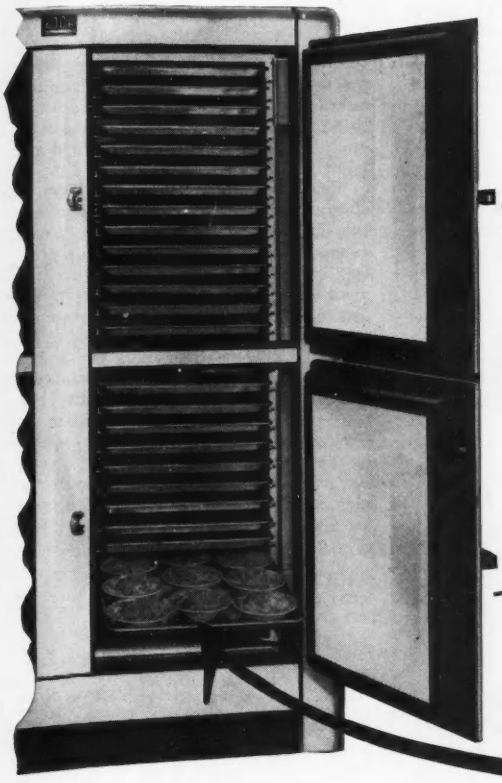
Vol. 76, January, 1955

* New foods that are making preparation work quicker and easier. A. Easton.—p. 36.
* Let him hang it where he likes. R. D. Bowers. —p. 39.

Choosing and Arranging Deep-Fat Fryers. Research by the National Restaurant Association has led to alterations in deep-fat frying equipment on the part of manufacturers and recommendations for proper methods, amount of fat, and frying capacities. A number of suggestions for figuring demand for deep fried foods, and hence needed frying capacity are listed. Three drawings show suggested arrangements for frying equipment.

Black Light Sanitation. Unsanitary conditions invisible to the human eye can be detected through the use of ultraviolet light, also called "black light." Grease film left on dishes by improper dishwashing is fluorescent under ultraviolet light. Eggs and shrimp starting to spoil may also be detected by this means, and the freshness of such foods as nuts, butter, and cream is indicated by the color of their fluorescence under black light. Rodents may be traced because of the fluorescence of their urine left on floors, and the sanitation of washrooms can also be checked by this means.

Foods for Easier Preparation. With increased use of canned and frozen foods, the trend is toward meals which are easier to prepare yet lend more variety to a menu. A good example of the easier and quicker foods are soups and soup bases. Soups can be used to mix with meats, and soup bases used for gravies and in meat loaves, stews, meat pies, and other dishes where added flavor is desired. The new frozen meals, such as beef, chicken, turkey, and tuna pies, beef



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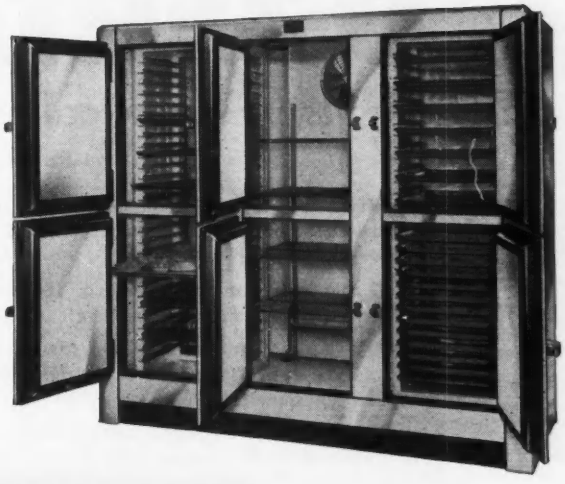

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Only 12 calories per serving in D-Zerta! (Sugar-sweetened gelatins have up to 83 calories per serving!)

D-Zerta is carbohydrate free! *If* you recommend a low-calorie or sugar-free diet, your patients can *still* enjoy tempting desserts and refreshing salads.

Low-calorie, sugar-free D-Zerta costs about 4¢ a serving. Nutrition information and recipes with every package. D-Zerta can be found in the dietetic foods section of food stores.

Made by the makers of JELL-O desserts . . .
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stew, and waffles are some of the more popular frozen items. Frozen fish sticks are becoming very popular and are easy to prepare. The use of baking mixes, powdered milk, and prepared pudding mixes help in making desserts. All of these new foods aid the food service operator in keeping down his food and labor costs.

Personal Property Liability in Restaurants. Theft, or sometimes mistaken identity of personal property, such as coats and hats, has long been a problem for the restaurant operator. The owner of the property who suffers the loss often expects to collect from the restaurant owner for replacement of the property. This article cites the law in several states concerning the restaurant owner's liability. Normally, the restaurateur is not responsible, unless the customer has definitely put the property in the care of the restaurant. If a coat, hanging on a rack, disappears, only the owner suffers a loss. Some actual cases are given.

WHAT'S NEW IN HOME ECONOMICS

Vol. 19, January, 1955

* Winter diets need winter fruits—fresh. F. L. Beinert.—p. 28.

* Winter diets need winter fruits—dried.—p. 30.

Fresh Fruits. Fruit is now increasingly available in fresh form all year long, and, although more fruit is eaten by more people than ever before, there is a continuous need for teaching its importance in well planned meals. A recent investigation disclosed that in some areas of the country fruit is entirely absent from daily meals. Naturally, the choice of fruit in winter meals depends on the market and the availability of fruits. The fruit that is available, however, can add color, nutrition, and taste to a meal, as well as variety in the way it is prepared. This article discusses the different fruits available during the winter months: apples, bananas, citrus fruits, cranberries, and pears. The different kinds and types of each fruit are given, as are instructions on how to prepare them in different ways. Many can be used as dessert or as flavorings, and some can even be used as vegetables.

Dried Fruits. Drying is one of the oldest methods of food preparation, especially the drying of fruit. At first, fruit was dried to save the excess food crop for future use, but later recognition of its concentrated food value, sweetness, flavor, and outstanding keeping qualities were recognized. Dried fruits are rich in caloric value because of the concentration of natural fruit sugars. They are also relatively good sources of iron and copper. The choice of a dried fruit naturally depends on the specific flavor or color one wants to add to a meal or recipe. This article gives the grading requirements for dried apricots, peaches, prunes, dates, and raisins. Many of these dried fruits can be eaten as is, and also are popular when stewed. Instructions for stewing the fruits and recipe ideas on how to obtain variety with dried fruits are included.

Meat...

and the Therapeutic Protein Dietary

For many years clinicians and surgeons have recognized the therapeutic value of the high protein dietary.

In more than normal amounts, protein is essential in the treatment of many diseases characterized by hypoproteinemia[1]—nephrosis,[2] sprue, pellagra, chronic colitis, certain liver afflictions,[3] anorexia of diverse etiologies. High protein intake helps to stabilize tissue protein in diseases in which protein catabolism is increased, such as hyperthyroidism and protracted high fever. Dietaries high in protein promote wound healing in the surgical patient and speed convalescence.[4] Sufficient protein ingestion constitutes a protective measure in the geriatric patient.[5] Large amounts of protein are required to satisfy the growth and other metabolic needs of the pediatric patient.

Meat provides large quantities of protein highly effective in the body economy—tissue growth and maintenance, formation of antibodies, enzymes, and protein hormones, and regulation of fluid balance. It also supplies valuable amounts of B vitamins and essential minerals including iron, phosphorus, and potassium. Appeal to the palate, easy digestibility, and its nutrient contribution make meat an important component of therapeutic diets.

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4. Kekwick, A.: Protein Deficiency in Surgical Patients, Ann. Roy. Coll. Surgeons England *7*:390 (1950).
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News Notes

Nutrition Committee for Heart Association. The American Heart Association has recently appointed a permanent Committee on Nutrition to function within its Council on Community Service and Education. Formation of this committee indicates the general recognition of the great importance of nutrition in the treatment and management of cardiovascular diseases, as well as its preventive potentialities. The Committee will function as follows:

(a) To serve in an advisory and consultant capacity in the field of nutrition to the committees and councils of the Association for the purpose of making the best possible use of nutritional information in all appropriate service and educational activities.

(b) To assist staff in the development and review of service and educational programs around the best opinions available covering the whole area of nutrition as it relates to the prevention, treatment, and management of cardiovascular diseases.

(c) To recommend regarding research, in the field of nutrition, that would be significant to the Association's threefold program of research, community service, and education.

One task which the Committee set for itself at its first meeting was to prepare a list of recommended books and pamphlets on nutrition and the cardiovascular diseases. In this connection, it was agreed to request the A.D.A. to help with general advice and in preparing such a list which could be used for reference by local associations as part of their public educational program.

The Chairman of the Committee is Dr. Herbert Pollack. The dietetic profession is represented on this Committee by Dr. Doris Johnson, Director of Dietetics, Grace-New Haven Community Hospital, New Haven, Connecticut; and Pauline Murrah, National Dairy Council, New York City. Other members of the committee are: Wendell Griffith, Ph.D.; W. Henry Sebrell, Jr., M.D.; Fredrick J. Stare, M.D.; LeRoy Voris, Ph.D.; Charles F. Wilkinson, Jr., M.D.; Robert R. Williams, Ph.D.; and James R. Wilson, M.D.

Dr. Hoobler Honored. Icie Macy Hoobler, former Director of the Research Laboratory of the Children's Fund of Michigan, Detroit, on January 5 was one of ten doctors to receive the "Award for Distinguished Service" which is sponsored by the periodical, *Modern Medicine*. This honor was given to Dr. Hoobler for her extensive studies of nutrition in relation to growth and reproduction. Recipients of the award are chosen on the basis of votes received from physicians throughout the country. This year, Dr. Hoobler was the only woman to be so honored. Presentation was made in Minneapolis.

Air Force Adopts Consulting Service. The Air Force Medical Service has developed a Medical Food Service Consultant Program to provide a high quality food service to all patients and personnel in its medical treatment facilities where no dietitian is assigned. This program is similar to the dietary consultation service currently used in small civilian hospitals. It is the first program connected with the Air Force whereby a dietitian serves full time in a consultant capacity. The first dietitians assigned to the new program are Capt. Julia R. Moynihan and Capt. Doris L. Northcott. Although an objective appraisal of the program will not be available until the end of the year, if the program proves effective in bringing about a better food service operation, it may be extended to other major or sub-commands having jurisdiction over several small hospitals.

Plentiful Foods MONTHLY LIST

Featured foods for March will be *canned corn*, *canned snap beans*, and *rice*. Other foods expected to be in good supply during March are:

Protein foods

Beef	Halibut
Dairy products	Pork
Eggs	Shrimp
Haddock	Tuna, canned
Turkeys, heavy	

Other foods

Dried prunes, small	Oranges, fresh and processed
Grapefruit, fresh and processed	Raisins
Lard	Vegetable fats and oils

A special promotion campaign to reduce surplus stocks of frozen small haddock fillets is being given the support of the Department of Interior. Through the Fish and Wild Life Service, the Department of Interior will work with schools, institutions, and food trade groups in an effort to move this frozen haddock as rapidly as possible. The biggest "push" will be in the so-called "haddock belt," which includes the northeastern and north central states and extends as far south as North Carolina.

Goat's Milk for Puerto Rico. Lydia J. Roberts, as President of the Committee on Nutrition for Puerto Rico, has been instrumental in preparing a new booklet, *Cabras Crielas para Leche* to further the Puerto Rican nutrition education program. In it, Puerto Ricans are urged to raise milk goats. In simple, easy-to-read Spanish, the booklet outlines the benefits of raising goats and the nutritive values of goat's milk, as well as detailed instructions on raising goats. These instructions include the points to look for in judging a milk goat; housing for goats with detailed plans for building a shelter; food for goats; breeding; care of young kids; milking techniques and care of milking equipment; and how to tell whether a goat is in good health. Because goat's milk is less expensive than cow's milk, but equal in nutritive value, it is hoped that the use of goat's milk can be increased in Puerto Rico. This booklet is an excellent example of nutrition education material prepared to meet the needs of a specific population or area. Copies are distributed by El Servicio de Extensión Agricola, Universidad de Puerto Rico, Rio Piedras.

Interns Graduate. On January 26, four dietetic interns were honored by graduation ceremonies on completion of their work at the Cook County School of Nursing. A dinner was given in the graduates' honor, followed by a program at which Clara Zempel, A.D.A. Director of Professional Activities, spoke to them on "How to Win." The following dietitians received certificates and A.D.A. pins from Millie E. Kalsem, Chief Executive Dietitian, Cook County Hospital: Hannah Call, Brigham Young University; Mildred Louise Hartwell, Texas Southern University; Gladys Ann Johnson, Webster College; and Amy Olivia Wilkins, Lincoln University.

Hospital Administration Training. On January 27 and 28, in Cleveland, the Ohio Hospital Association sponsored an Institute on Training Hospital Personnel which was attended by administrators, dietitians, assistant administrators, personnel directors, housekeepers, directors of nursing schools, and directors of training courses. The purpose of the institute was to give this group tools with which to work and with which to improve job performance, thus strengthening good administration. Special emphasis was placed on the training of "top level" supervisors, with the keynote being that training of employees, whether supervisors or others, to be successful, must be based on a program carefully planned to develop the skills needed to reach an established goal. The course for dietary assistants which has been developed cooperatively by the Cleveland Dietetic Association and the Cleveland Health Council was used as an example of a course planned to meet an established goal. The course is now in its third year and can be judged by the performance of its graduates in carrying on line supervision. The tentative outlines approved by The American Dietetic Association for supervisory training at the vocational school level were presented to the group and accepted with great enthusiasm.

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"SPECIAL DIETS" SPECIALLY GOOD!

(specially convenient, too)

SERVE Kellogg's energy-rich cereals

When the doctor orders "Special Diet," serve Kellogg's Individual cereals. They're not only highly nutritious (made from whole grain or with whole grain values *restored*) but they're specially good tasting to young and old alike. Specially convenient, too—because Kellogg's Individuals save meal planning, preparing and serving, save money because they reduce waste to a minimum.

KELLOGG'S "SPECIAL" DIET CEREAL CHART

Low Sodium—Shredded Wheat
High Vitamin—Pep
High Protein—Corn-Soya
Bland—Corn Flakes, Rice Krispies
Wheat Allergy—Corn Flakes, Corn-Soya
High Residue—Raisin Bran, All-Bran

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Kellogg's Corn Flakes • Rice Krispies • Pep • Raisin Bran
40% Bran Flakes • All-Bran • Shredded Wheat • Corn-Soya
Sugar Pops • Sugar Frosted Flakes • Sugar Smacks

World Health Day. This year World Health Day will be celebrated on April 7, according to an announcement by the Director-General of the World Health Organization. The theme will be "Clean water means better health," a subject which emphasizes WHO's role in improving environmental sanitation.

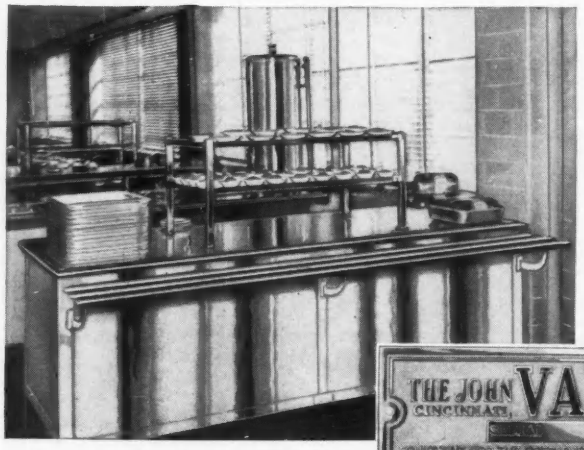
FAO in Egypt. At the special invitation of the Egyptian government, the Food and Agriculture Organization last year sent a special mission to Egypt to learn to what extent surplus supplies of dried skim milk (such as those distributed by CARE) could be used to raise the level of nutrition and stimulate consumer demand. At the same time, the potentialities for increasing local milk supplies in the country should be studied. The survey indicated that similar surveys should be made in other countries likely to receive such bounties, if the economy and dairy industry of the country, as well as international trade, are not to suffer.

TV Course in Home Economics. Western Reserve University, Cleveland, will offer a TV college credit course in home economics titled "Home Management." The course will be conducted by Dr. Jane DeMelto on station WEWS three mornings a week for a half-hour each session. It will stress the basic principles of home management and will deal primarily with "the management of family resources for the purpose of achieving family goals." Content and requirements for the course will be the same as its campus counterpart, and students may contact the instructor through correspondence and telephone. A home study guide, which contains a schedule and summary of the lectures, written assignments, and reading lists, is furnished students who are taking the course for credit.

Food Operator Award. The Institutional Food Manufacturers of America is offering this year an award to the "Food Service Operator of the Year." Presentation of the award, which will be in the form of a 12-in. golden colored plate, will be made at the organization's banquet on May 10 in Chicago. Individuals, corporations, or publications serving the institutional field are urged to submit nominations, which should include full information on the nominee's contributions to the field. The winner will be judged on the basis of his or her work to advance the cause of the public feeding industry. These efforts can take the form of specific contributions to the community, those who service it, and those who patronize it. Nominations should be sent to Leo Nejelski, Executive Director, Institutional Food Manufacturers of America, 12 East 41st Street, New York 17.

Booklet for Supervisors. To help supervisors increase efficiency and economy in their units, the Department of Health, Education, and Welfare has issued a new pamphlet on "Getting Work Done with Fewer People." This small leaflet is divided into four parts: "Improving the Organization of Work," which includes an illustration of a work distribution chart; "Improving and Simplifying Methods of Work," which briefly summarizes the principles of time-and-motion economy and includes a twenty-three-point check list of suggestions for savings; "Increasing Employees' Ability to Do the Work"; and "Increasing Employees' 'Will-to-Work.'" The principles discussed in this small booklet are general in nature and applicable to almost any situation where a supervisor-training program is being conducted or contemplated. Copies of this booklet, which is listed as Training Manual No. 8, are available for 15 cents a copy from the Government Printing Office, Washington 25.

Training Canteen Workers. A new *Instructor's Outline for Canteen Training* has recently been issued by The American National Red Cross for use by authorized volunteer instructors in training Red Cross canteen volunteers for all mass feeding operations carried on as a regular part of Red Cross programs and activities. The manual gives more emphasis than formerly on feeding in natural disasters as well as those caused by enemy-action. With this course, volunteers learn methods of organizing large-scale feeding under normal as well as a variety of disaster conditions; techniques and short-cuts of preparing and serving foods in quantity; mobile and outdoor feeding operations;



EMPLOYEES' CAFETERIA
NEW UNIT B
HOPEMONT SANITARIUM
HOPEMONT, WEST VIRGINIA

Architect • Edward J. Wood & Son • Clarksburg

Van equips *third* kitchen at Hopemont Sanitarium

★ Van has earned an enviable record of satisfaction with its food service equipment. Reorders from institutions 10, 20, 30 . . . even 50 years after its first installation underline that satisfaction. Hopemont Sanitarium is no exception.

★ Above is illustrated the Van-equipped employees' cafeteria in the new Unit B completed late in 1954. All Hopemont Sanitarium buildings have Van kitchen equipment. It is capable of serving three meals a day to 600 patients and employees.

★ When you require food service equipment improvements, get the benefit of Van's *century of experience.*

The John Van Range Co.

EQUIPMENT FOR THE PREPARATION AND SERVING OF FOOD

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Father-Son Hotel Team Thrives on a Commonsense Approach to Boontonware

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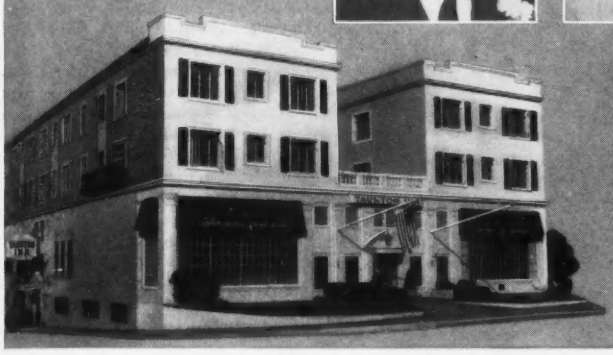
Manager
Taunton Inn
TAUNTON, MASS.

RICHARD T. DOWNES
Resident Manager
Poughkeepsie Inn
POUGHKEEPSIE, NEW YORK



The Downes, father and son hotel team, after six years' experience with Boontonware, say this:

"You can always come out on top with Boontonware if you don't overdo the miracle of Melmac. Boontonware may never break. But after long hard use, it will start to show its age, like anything else.

"At that point, however, it has already outlasted ordinary dinnerware at least three times. By then we are glad to replace the worn pieces with new. This way, we preserve the original beauty of the installation for the customer, and still stay way ahead of the game from a cost-of-operation standpoint."

After using Boontonware for six years at the Taunton Inn, Host J. Edward Downes still claims that there is nothing like it for resistance to breakage, ease of handling, and refreshing variety of new color.

Son Richard T. Downes shows how he feels about this by making a switch to Boontonware one of his first moves as Resident Manager of The Poughkeepsie Inn.

8 Colors to Mix or Match
POWDER BLUE
CRANBERRY RED
SEA FOAM GREEN
FOREST GREEN
GOLDEN YELLOW
COPPER ROSE
STONE GRAY
TAWNY BUFF

Boontonware complies with CS 173-50, the heavy-duty melamine dinnerware specification as developed by the trade and issued by U. S. Department of Commerce, and conforms with the simplified practice recommendations of the American Hospital Association.

See your regular Supply House or write to us for the name of your nearest Dealer.

BOONTON MOLDING COMPANY, BOONTON, N. J.

and safety and sanitation in food handling. Dietitians interested in disaster or emergency mass feeding training may obtain a copy of this manual by writing to Dorothy L. Bovee, Food and Nutrition Consultant, The American National Red Cross, Washington 13, D. C.

Merrill-Palmer Quarterly. The recent publication of the first issue of the *Merrill-Palmer Quarterly* by the Merrill-Palmer School, Detroit, has been heralded by the school as a means of providing a channel for publication of material produced by present and former associates of the school. In it, the editors plan to publish reports of projects in progress; results of exploration in both teaching and research; papers by staff and consultants; results of significant conferences; and dissemination of information characterizing the broad aspects of Merrill-Palmer's program. The Merrill-Palmer program of teaching, service, and research provides opportunities for the study of human development and human relations with special reference to the family and community. The *Quarterly* has been founded to further these objectives by presenting material on the concerted efforts of numerous professional disciplines toward the advancement of knowledge in the many areas of family living. Editor of the new publication is Ralph E. Sloan, formerly editor for the Research Laboratory, Children's Fund of Michigan. Subscriptions, which are $1.50 a year, may be ordered from the Merrill-Palmer School, 71 East Ferry, Detroit 2.

Booklets on Child Feeding. Dr. Miriam E. Lowenberg, Head, Department of Foods and Nutrition, The Pennsylvania State University, is author and co-author of four new pamphlets dealing with nutrition during pregnancy and child-feeding published by the University.

In the first two, "Building Your Baby" and "Mealtimes with Young Children," she is co-author with Mary M. Aldrich. In the former, food habits during pregnancy is the topic. A pattern of "What You Should Eat" is outlined, followed by sections on the reasons for eating certain foods, a discussion of special dietary problems during pregnancy, and a sample day's food plan. Copies are 20 cents each.

The second pamphlet, "Mealtimes with Young Children," reflects Drs. Aldrich's and Lowenberg's experience with child-feeding. It not only recommends the proper foods for preschool children, but also discusses the "why's," and warns of the normalcy of small feeding idiosyncrasies in youngsters. The section on "Children Like Good Food" demonstrates the authors' knowledge of children's eating habits and viewpoints toward food and feeding. A sample menu is included, as well as a short bibliography. The cost of this pamphlet is also 20 cents a copy.

The third and fourth releases are recipe booklets. In "Recipes for Foods Children Like," Dr. Lowenberg has chosen twenty-three recipes from her collection gathered during a number of years' experience in feeding children in nursery schools. These recipes are divided into five groups: meat, fish, and other main dishes; fruits; sandwiches; desserts; and cookies and sweets. Copies may be obtained for 25 cents each.

In the last of the series, "Happy Birthday Everybody," Dr. Lowenberg has joined forces with Evelyn Beyer to present suggestions for menus and foods for preschool children's birthday parties. The book is introduced with the listing of eleven suggestions or rules for adults to follow in planning children's parties, after which menus for two winter birthday parties, a spring birthday party, and a Christmas party are presented, followed by recipes for each menu item. Some of the ideas are quite intriguing, such as serving milk with a tray of colored ice cubes, from which the child may choose the color he likes best. This booklet, too, sells for 25 cents a copy.

Any or all of these booklets may be ordered from the College of Home Economics, The Pennsylvania State University, State College.

Color in Foods. In November 1953, a symposium on "Color in Foods" was sponsored by the Advisory Board on Quartermaster Research and Development. The report of this two-day meeting has now been published by the National Academy of Sciences-National Research Council. Papers of special

You're right! IT'S A GEM IN THE KITCHEN

LEGION's Table Tilting, stainless steel, seamless drawn body, steam jacketed kettles check perfectly in every way

- ☑ One thousand and one uses.
- ☑ Truly ⅔ steam jacketed for fast, even heating.
- ☑ Sanitary half open bead — no dirt catching crevices.
- ☑ Perfect balance because trunion arms are mounted in the middle of the kettle body.
- ☑ Intermediate locking stops for several tilted positions.
- ☑ Heat-proof handles on cutoff valve and tilting lever.
- ☑ The hard polished surface will not pit or crack — and cleans easily with any detergent.
- ☑ Conform with the strictest health department regulations.
- ☑ Yes, check the price — you'll find Legion kettles the best buy on the market.

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PIONEERS IN STAINLESS STEEL

Always The Finest

BECAUSE THEY'RE ALWAYS THE BEST OF THE PACK

Heinz
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You can serve Heinz products with real pride, because Heinz always sends you the very best of each year's pack!

Heinz
FRUITS AND VEGETABLES
57

Fruits

Apples • Grapefruit Segments
Apricot Halves • Sour Pitted Cherries
Pineapple Tidbits • Pineapple Slices
Freestone Peach Halves
Apple Sauce • Cling Peach Halves
Sliced Freestone Peaches
Sliced Cling Peaches • Fruit Cocktail
Bartlett Pear Halves

Vegetables

Sweet Peas • Tomatoes • Lima Beans
Blue Lake Cut Green Beans
Blue Lake Whole Green Beans
Sliced Beets • Spinach • Whole Beets
Tomato Paste • Whole-Kernel Corn
Cream-Style Golden Corn
Sliced Carrots • Diced Carrots
Louisiana Golden Yams

YOU KNOW IT'S GOOD BECAUSE IT'S HEINZ!

When you are called on to recommend a special diet . . .

. . . check the many advantages of

Old London

INDIVIDUAL SERVICE

MELBA TOAST

Containing only 17 calories per slice, tasty Old London Individual Service Melba Toast helps make reducing and other diets simple and effective for both you *and* your patients. Attractive, moisture-proof cellophane packaging keeps toast fresh and crisp . . . preserves that delicious nut-like flavor preferred by millions . . . eliminates the inconvenience caused by bread deprivation. Low 1⅓¢ cost per serving. Faster handling, lack of bottom-of-box breakage. No costly left-over waste. See for yourself why Old London *helps take their weight off your mind*. Send coupon for FREE SAMPLES today!

CALORIE CHART

Old London Melba Toast	17 Calories per slice
Roll or Bun	120 Calories
White Bread	65 Calories per slice
Rye Bread	55 Calories per slice

CHEMICAL ANALYSIS: (WHITE MELBA TOAST)

Moisture	3.23%
Ash	2.77%
Protein Nx 6.25	13.90%
Fat—Ether Extract	1.87%
Crude Fibre	0.60%
Carbohydrates by Difference	77.63%
Caloric Value per slice	17
Weight of average slice	4.5 grams

2 slices to package . . . 180 packages per caddy

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KING KONE CORP., DEPT. C-6 788 EAST 138th STREET, NEW YORK 54, N. Y.

Please rush me, without obligation, FREE Samples and information about Old London Individual Service Melba Toast!

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interest which are included in this report are: "Color in Relation to Food Preference," "Color Dimensions of Interest to the Consumer," and "Color Changes during Storage of Foods." Copies are available on request to those concerned with this field from the Scientific Publications and Reports Office, Quartermaster Food & Container Institute for the Armed Forces, 1819 West Pershing Road, Chicago 9.

Kwashiorkor in Central America. In 1951, the Joint FAO/WHO Expert Committee on Nutrition, after reviewing a report on kwashiorkor in Africa, recommended that further study be made in other parts of the world. The two organizations sent a mission to Central America in the latter part of 1951 to make a survey in that area. Guatemala, Honduras, Nicaragua, Costa Rica, and Panama were visited at that time, and a second mission was sent to Brazil in 1953. A report of this survey is now available under the title, *Síndrom Policarencial Infantil (Kwashiorkor) and Its Prevention in Central America.* Authored by Marcel Autret and Moise Behar, the following are the major topics discussed: medical aspects of the syndrome, influence of diet on the syndrome, etiology, and prevention. Copies of this report may be ordered at $1 each from Columbia University Press, International Documents Service, 2960 Broadway, New York 27.

News of State Associations

Hawaii Dietetic Association. On January 19, members of the Hawaii Dietetic Association enjoyed a tour through the Pan American flight kitchen. Those attending were shown how the air line prepares, stores, and serves the food. Especially interesting was the discussion on the preparation of modified diets, such as a diabetic diet.

Maine Dietetic Association. Featured speaker at the fall meeting of the Maine Dietetic Association held at the University of Maine, Orono, was Dr. Mary M. Clayton, Nutritionist from the University's Agricultural Experiment Station. Her topic was "Findings for Maine from the Northeastern Regional Nutrition Project."

Massachusetts Dietetic Association. The Massachusetts Dietetic Association recently sponsored both a "Refresher Course in Nutrition" for graduate dietitians and also a conference (cooperatively with the Massachusetts Home Economics and Public Health Associations) on "Current Research in Nutrition." Speakers were drawn from Harvard University, Massachusetts Institute of Technology, U. S. Public Health Service, and the University of Massachusetts.

Two Massachusetts dietitians, Adele F. Dronsick and Rachel Jones, served as panel members at this year's annual Diabetes Fair. The Fair, which was begun in 1949, drew a total attendance this year of 5800.

FOR PORTION-CONTROLLED PROFITABLE CHICKEN SOUP

Kraft Chicken Base

Here's how to make delicious Chicken Soup in a jiffy!

Simply add hot water to Kraft Chicken Base to get a full-bodied, perfectly seasoned chicken soup. For variety add noodles, rice or vegetables. 1-lb. jar makes 5 gallons of soup at a cost of 2¢ per 6-oz. serving.

Saves time, assures uniformity, and cuts costs!

Look at the five big advantages Kraft Chicken Base offers you:

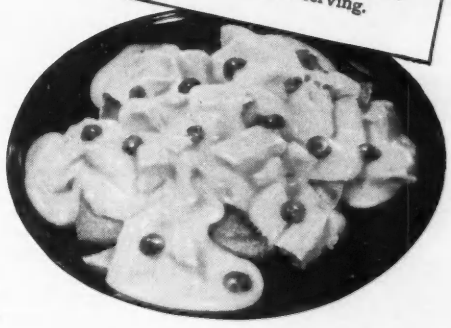
1. **Economical**—One step preparation—timesaving, no fuss, no waste. No expensive labor in preparing soup stocks.

2. **Profitable**—Perfect portion control enables you to measure profits to the penny. You know exactly how much each serving costs you.

3. **High Quality**—Uniformity and high quality assured through rigid factory controls. No chance for soups to vary from day to day.

4. **Versatile**—Makes superb soups. Added to such foods as chicken dishes, gravies, stews and meat loaves, it enhances and brings out their flavor—also effective as an enricher in your own soup stocks.

5. **Convenient**—No big cans to store or handle—a few small jars are the equivalent of several cases of canned soup.



Also Unequalled as a Seasoning for Foods

Use Kraft Chicken Base to add delicious extra chicken flavor to chicken pot pie, chicken à la king, croquettes and countless other dishes.

Processed under U.S. Dept. of Agriculture inspection

THREE OTHER POPULAR KRAFT SOUP BASES

CS Base With Chicken Fat—Made with real chicken fat and processed under the supervision of the U.S. Dept. of Agriculture. Use it for soups, for bringing out the flavor of foods, for enriching your own soup stocks. Packed in 1-lb. jars.

Soup Base Flavored With Beef Extract—Made from the finest beef extract, monosodium glutamate, beef fat and seasoning. Makes a rich soup, also fine for seasoning roasts, hamburgers and leftover meats. Packed in 1-lb. jars.

Onion Soup Base—A complete French Onion Soup prepared with the skill of a continental chef from a carefully seasoned base and select onion flakes toasted golden brown in chicken fat. The 8-oz. jar will make 5 quarts of delicious onion soup.

THE NATION'S TASTE IS YOUR BEST BUYING GUIDE!

KRAFT FOODS COMPANY
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KRAFT Foods Company INSTITUTIONAL DIVISION

At the January meeting of the Massachusetts Association, Ellen Davis spoke on "Nutrition from Cradle to College." After the meeting, a reception was held honoring Dr. Elda Robb, Past-President of the Massachusetts group, who has accepted a new position on the staff of the Food and Agriculture Organization of the United Nations. After August 1, Dr. Robb will be at the FAO headquarters in Rome.

Minnesota Dietetic Association. Minnesota dietitians will participate in a "Career Festival," March 8, 9, and 10 at St. Thomas College, St. Paul. This event is sponsored by five Twin City colleges—Macalester, Hamline, St. Catherine's, St. Thomas, and Augsburg. High school seniors from St. Paul and Minneapolis and those within a 60-mi. radius will be invited to attend.

New York State Dietetic Association. In November, the *Greater New York Dietetic Association* heard Charles Hermann from the Food and Drug Administration speak on "Current Aspects of the Pure Food and Drug Act." He emphasized the legal protection against the use of drugs in foods and cosmetics and discussed a law which is being considered that would offer the same type of protection for chemicals. A film, "Fraud Fighters," showing the work of the regional FDA office, was shown. The February meeting featured the annual Mary Swartz Rose Memorial Lecture which is held at the New York Academy of Medicine. Dr. Ancel Keys of the University of Minnesota was the honored speaker this year; his subject was "Dietary Fats and the Health of Adults."

For their November meeting, members of the *Long Island Dietetic Association* enjoyed a "town meeting program," at which "Team Work in the Dietetic Team" was discussed by Dr. George E. Erickson, Assistant Superintendent, Meadowbrook Hospital, and Justina Eisenhauer, Assistant Professor of Medicine and Surgery, School of Nursing, Adelphi College.

At the October meeting of the *Rochester Dietetic Association*, Dr. Estelle Hawley, University of Rochester School of Medicine, spoke on "Better Breads and Cereals." Her presentation included a demonstration with white rats, showing better development with the Cornell formula bread over that of regular white bread.

Ohio Dietetic Association. April 29 and 30 will be the dates for the 34th annual convention of the Ohio Dietetic Association to be held in Cincinnati. The convention will feature as speakers: Dr. Anthony J. J. Rourke, Consultant in Hospital and Medical School Administration, New Rochelle, New York; Frances MacKinnon, Associate Professor of Nutrition, University of North Carolina, Chapel Hill; Dr. Elizabeth Munves, Assistant Professor of Home Economics, New York University; and Dr. Warren Guthrie, Head, Department of Speech, Western Reserve University. The theme of the program will be "Strong Management through Strong Leadership."

The Ohio Dietetic Association this year is making a special effort to further vocational guidance, having voted an appropriation of $500 for this purpose, in addition to the $20 which is also allotted to each local association for a project of their own choosing, such as an exhibit at a county fair. Special appeals are being made to each member in Ohio to contribute her services wherever she is able.

Pennsylvania Dietetic Association. At the December meeting of the *Philadelphia Dietetic Association*, L. Kent Babcock of the Aetna Life Insurance Company, Philadelphia, discussed "Savings through Annuities." After the business session, special recognition was given to Elizabeth Miller, who recently retired as Chief Dietitian, Philadelphia General Hospital. In January, the Professional Education Section presented a panel discussion on "Nutrition Instruction of Medical Students." Panel participants were: Dr. Charles Shuman, Temple University School of Medicine; two students, one from Temple University School of Medicine, the other from the University of Pennsylvania School of Medicine; and Corinne Robinson, Drexel Institute of Technology. Dr. E. L. Bortz, Chief of the Medical Service, Lankenau Hospital, acted as moderator.

The *Pittsburgh Dietetic Association* has been participating in an Obesity

Yes, it's still hot!!
thanks to . . .
J&J fast-service
FOOD TRAY TRUCKS
designed to speed tray service from floor diet kitchens, heated tray trucks, subveyor stations, and special dumb-waiters.
specifications
Model 1359, left, has stainless steel shelves, aluminum bronze chassis. Also available in polished stainless steel throughout, or in aluminum bronze finish throughout.
Length Overall 25" Height Overall 42"
Width Overall 21" Shelf Clearance 7"
Shelf Size 16½" x 24"
. . . the dietician's perfect answer to the age-old problem of transporting food to the patient and having it hot and appetizing on arrival. 4-tray unit combines mobility with stability . . . the two essential requirements in hot food delivery. Four double ball-bearing swivel casters with 5" ball-bearing rubber-tired wheels facilitate fluid motion, yet prevent chance of upset accidents or uneven motion that might slop or spill liquids. Swept-back handle makes it easy to maneuver without kicking the unit or bumping it with the knee.
These serviceable units nest when not in use to conserve valuable space in corridors.
Jarvis AND Jarvis
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4 WAYS TO Put More Profit in Lenten Meals

FREE! MAIL COUPON FOR 4 MONEY MAKING RECIPES FOR RICE-TUNA DISHES MADE WITH UNCLE BEN'S RICE

Creamed Tuna on Uncle Ben's Rice. Costs less than 19¢ per serving!

Here are recipes that put sure "come-on" in Lenten menus. Recipes that keep them coming back for more. And they're free. Just mail coupon below.

These special recipes show you how to turn out new tuna-and-rice dishes that taste wonderful and go further because they're made with fluffy Uncle Ben's Rice.

Uncle Ben's, you know, is the famous rice that cooks up fluffy every time (guaranteed!) so you get more servings per pound. And with Uncle Ben's, there's no rinsing or draining. No sticking to pots and pans. Stays fresh longer on the steam table, too.

And your customers *know* and *prefer* Uncle Ben's. It's America's best-liked brand of quality long grain rice. Send for your free recipes today.

Uncle Ben's CONVERTED LONG GRAIN RICE

EACH GRAIN SALUTES YOU

Uncle Ben's Converted Long Grain Rice in 14 oz., 28 oz. packages, and 10 lb., 25 lb., 100 lb. sacks. Every grain weevilproof!

Uncle Ben's exclusive vacuum pressure process drives B vitamins (lost in ordinary milling) deep into the grain. Far more nourishing. Easier, surer cooking. *Guaranteed fluffy!*

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Gentlemen:
Send your 4 free tested recipes for money-making dishes prepared with tuna and Uncle Ben's Rice.

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Research Study conducted by the Graduate School of Public Health, University of Pittsburgh. Programs thus far have included: "The Role of the Dietitian from the Administrative Point of View," by Walter McNerney, Assistant Professor of Hospital Administration of the School; and a panel discussion on "What Is the Relationship between Obesity and Health?" with Dr. Robert E. Olson, Director of the Study; Dr. Albert V. Corrado, psychiatrist; Dr. Marcia Riegl, nutritionist; and Elizabeth Tarquinio, dietitian.

At the regular January meeting of the Pittsburgh dietitians, Dr. Fred McWilliams, University of Pittsburgh School of Medicine, spoke on "Diet Therapy in Pediatric Practice." In March, Florence Fralin will lead a discussion on "The Patient Goes Home from the Hospital," in which the ways that community agencies work together in caring for patients will be demonstrated. In April, the group will hear Ina S. Lindman, United Fruit Company, speak on "Foods with Convenience Built In"; for the May meeting, a panel discussion on "Nutrition and Alcoholism" is planned.

Ruth Silvester is Chairman of a committee for the Pittsburgh Association which is developing a training course for dietary assistants. To date, course outlines have been completed and hospital superintendents have agreed on the need for such a course, indicated the number of such employees they can use, and estimated the salaries they will offer. The Association hopes to have the course in operation soon.

Texas Dietetic Association. In cooperation with the Texas Hospital Association, members of the Texas Dietetic Association are serving as contributing editors for a "Bulletin on Hospital Food Service," a publication designed to give information of value to administrators of small hospitals. Members participating in this service are Mary Ellen Dambold, Rosa Adair, Eileen Williams, and Frances Hitt.

A report on studies on hypnosis in the treatment of burn patients was featured at the January meeting of the *Dallas Dietetic Association*. Staff members of Southwestern Medical School participated with association members in the program.

no more HOT SPOTS
no more burning...

Vollrath stainless steel ware with alloy heat-conductor bottoms!

Even-heat frying with alloy heat-conductor bottoms!

No. 7841 ..... 6¾-in. diam.
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Bonded-on alloy bottoms assure top cooking performance

Only Vollrath Ware offers you such perfect cooking performance . . . in gleaming, easy-to-clean stainless steel. The *bonded-on alloy heat-conductor bottoms* soak up heat *faster* . . . spread heat *evenly* . . . retain heat *longer!* Combined with the long-life, long-service you know you get from stainless steel, these extra advantages make Vollrath Ware the right ware for you! Get Vollrath Ware now!

Famous Windsor Sauce Pans with alloy heat-conductor bottoms!

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First in STEEL Utensils

Stainless Steel and Porcelain Enameled Steel

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Association Activities

Mid-Winter Meetings. The A.D.A. Executive Board and other members of the *Coordinating Cabinet* held their mid-winter meetings in Chicago, January 26 to 29.

On February 14, the *Joint Committee of the American Hospital Association—A.D.A.* met in Chicago. Recent activities concerned with the promotion of the shared dietitian and the training of the food service supervisor were among the topics discussed.

The A.D.A. *Membership Requirements Committee*, with Esther A. Atkinson as Chairman, met in the Headquarters office on February 18 and 19 to discuss further changes in membership requirements.

A.D.A. Exhibits. The Chicago Dental Society held its 1955 midwinter meeting in Chicago, February 6 to 9. A.D.A. presented its exhibit, "Nutrition and Dental Health." Members of the Chicago Dietetic Association, under the chairmanship of Katherine Vatz, represented the Association.

New List of Publications. A revised Publications and Reprints list for A.D.A. materials is now available. New mimeographed and printed materials which are listed for the first time, include:

Food Service Supervisors
Class Outline ..... $.25
Hospital Experience ..... .25
National Food Patterns and Recipes, Selected List of References .... $.50

Of particular interest to dietitians teaching dietetic interns and student nurses are the following new listings:

A Guide to the Dietetic Intern's Experience in Nutrition Education for Student Nurses. 1954 Professional Education Project ..... $.50
Generalizations for the Curriculum Guide for the Dietetic Intern .. $1.50
Sample Teaching Units (Supplement to the Curriculum Guide) ..... $.50
Planning a Workshop on Teaching Nutrition in the Nursing Curriculum. 1954 Professional Education Section Project ..... $.15

HERRICK

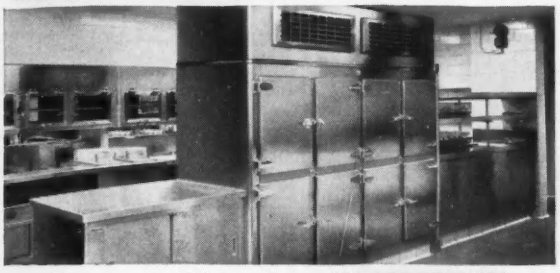
STAINLESS STEEL REFRIGERATORS

Performance-Proved

in food service award-winner

at FAMOUS-BARR, St. Louis, Mo.

A major Institutions Magazine 1954 Food Service Award went to the remodeled dining rooms and kitchen at the Famous-Barr Company in St. Louis. Designers of the project were Justin H. Canfield and Fred Rundall. HERRICK units were supplied by Southern Equipment Company. At left is a picture of the Famous-Barr downtown department store, St. Louis landmark.



Above is part of the modernized kitchen. It shows a HERRICK stainless steel, double front pass-through top mounted refrigerator used for desserts, salads and sandwich materials. At right is a two-door HERRICK for holding sauces, condiments and small quantities of items used from day to day. Other HERRICK units include a refrigerator-freezer combination and a short-order refrigerator.

In line with its policy of continued modernization, Famous-Barr Company, St. Louis department store, has transformed its tea room into two deluxe dining rooms, both served by one central kitchen. The St. Louis Room and Rose Room offer the very latest and finest dining facilities. In line with its policy of buying only the best equipment, Famous-Barr has selected HERRICK Stainless Steel Refrigerators for the new kitchen. • HERRICK Stainless Steel Refrigerators assure the utmost in sanitation and employee convenience. From meats to salads . . . eggs to ice cream . . . they provide year-after-year complete food conditioning. Write for the name of your nearest HERRICK supplier.

HERRICK REFRIGERATOR CO., WATERLOO, IOWA
DEPT. D., COMMERCIAL REFRIGERATION DIVISION

HERRICK *The Aristocrat of Refrigerators*

Wash more dishes . . . cleaner . . . with calgonite®

Film on glasses, silver and dishware will drive customers away fast. At the same time, profits depend on watching costs. Restaurant operators all over the country have found that the way to keep dishwashing costs *down* and customer satisfaction *up* is to use CALGONITE.

CALGONITE keeps costs down because in any good dishwashing operation, it delivers really clean dishware at the *lowest cost per clean dish.* Even heavy, stubborn grime is easily washed away, and all your dishware comes through shining clean . . . glasses and silver gleam . . . and even your dishmachine is kept clean and film-free too.

LET US PROVE IT TO YOU!

We will put CALGONITE in your dishmachine—at no cost to you—
—and show you that you too can

wash more dishes...cleaner with calgonite

CALGON, INC. • Hagan Building, Pittsburgh 30, Penna.

The following Kodachrome slides are also offered for loan in this new listing:
"Life as a Dietetic Intern" (produced in 1954)
"Dietetics—A Career with a Choice."

State Dietetic Meetings. The following national representatives will be attending state dietetic association meetings in March and April:

March 4–5—Mary Ellen Johnson, Oklahoma Dietetic Association, Tulsa
March 10–11—Fern Gleiser, Illinois Dietetic Association, Chicago
March 25–26—Martha N. Lewis, Kentucky Dietetic Association, Lexington
April 1–2—Jane Hartman, Alabama Dietetic Association, Auburn
April 1–2—Doris Johnson, Virginia Dietetic Association, Richmond
April 21–22—Fern Gleiser, Iowa Dietetic Association, Ames
April 22–23—Winifred H. Erickson, Wisconsin Dietetic Association, Milwaukee
April 27–28—Mary Reeves, Michigan Dietetic Association, East Lansing
April 27, 28, 29—Fern Gleiser, Pennsylvania Dietetic Association, State College
April 28–29—Winifred H. Erickson, New York State Dietetic Association, New York City
April 28, 29, 30—Marguerite L. Pettee, Texas Dietetic Association, Houston
April 29–30—Mary Ellen Johnson, Ohio Dietetic Association, Cincinnati

Appetites Need Tempting?
Budgets Need Cutting?

LET MAGGI DO IT!

The meal-planner's best friend! . . . Anywhere meal-planning is a problem, Maggi's Granulated Bouillon and Maggi's Seasoning can be a big, BIG help.

Coaxes out hidden flavor! . . . Maggi's Seasoning is a highly concentrated cooking aid that multiplies and emphasizes the natural taste of food. Makes meats, casseroles, gravies, stews taste marvelous! Maggi's Granulated Bouillon Cubes dissolve instantly, add appetizing, meaty flavor.

Economical, easy to use! . . . Naturally, Maggi's cooking aids make low cost dishes taste better . . . transform leftovers into treats, all in a few seconds time! So keep these world-famous products—Maggi's Seasoning and Maggi's Granulated Bouillon Cubes—always on hand!

Let MAGGI aid in special diets, too!

Maggi's Seasoning and Maggi's Granulated Bouillon Cubes are high in protein, low in calories. Extremely easy to digest . . . even more digestible than simple foods such as toast. (Not recommended for salt-free diets.)

FREE

VALUABLE FOOD PLANNING TIPS!
Quantity recipes for delicious soups, stews, meat dishes!

THE NESTLE COMPANY, Inc.
2 William St., White Plains, N. Y.

Name .....
Address .....
City .....Zone.....State.....

MAGGI'S® SEASONING — GRANULATED BOUILLON CUBES

News of Products and Services

The *Borden Company* is introducing in a limited number of markets (northern New Jersey and the Albany-Troy and Stamford-Greenwich areas) a pure orange juice under the brand name, "Orange Blossom." The product comes in ready-to-serve, 1-qt. waxed paper containers similar to milk cartons and is available to consumers just three days after the tree-ripened fruit is picked in Florida. The food value of the juice is actually the same as fresh orange juice. The oranges are juiced in Florida and then transported in bulk to the distributing area and put into retail packages. The juice will be available throughout the year, except for a short six- to eight-week period when there is no Florida orange crop.

Another new product of the *Borden Company* is an ice cream specialty called "Elsie Molds"—machine-filled, individual mold forms of ice cream and sherbet, consisting of a layer of ice cream topped with a layer of fruit sherbet. They are packed in a disposable, round, clear vinyl film mold.

Robertshaw-Fulton Controls Company has announced the production of two new temperature controls, the "Potwatcher" and the "Temp 'n Time" oven control. The Potwatcher, which is a top-burner control for gas ranges, combines an automatic timer and a high-low dual valve in a single unit. The Temp 'n Time oven control is also designed for gas equipment and is claimed to be the first mechanical timer capable of controlling a gas valve with sustained accuracy.

The *National Dairy Council* has released a new 13½-min., 16 mm. sound, Kodachrome film titled, "It's All in Knowing How." This film, through the combination of story and animated charts, stresses the relationship of good health habits, including nutrition, to enjoyment of life, success in work and play, and personality and appearance. The importance of good food, family meals, family relationships in recreation activities, sleep, and exercise are discussed. The film is a story of a high school student who becomes careless about eating and sleeping habits. The effect of these careless habits is explained, and the film shows how the student works out a suitable, yet interesting chart on proper food which will lead to better health. The chart is based on the Recommended Dietary Allowances. The movie emphasizes the fact that individual problems in eating need individual attention. It is especially recommended for adolescent audiences, but may also be shown to adults. The film is available for loan from Association Films, with offices in San Francisco, Dallas, Chicago, and Ridgefield, New Jersey. The National Dairy Council will send on request a folder listing all of its films which are available through this source.

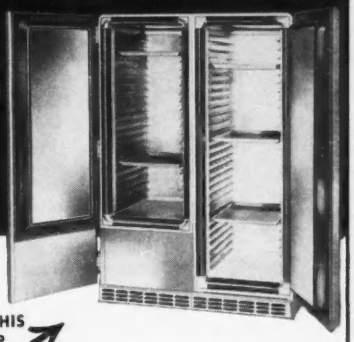
ONLY WITH THESE REFRIGERATORS CAN YOU

CHANGE the INTERIORS

in just a few

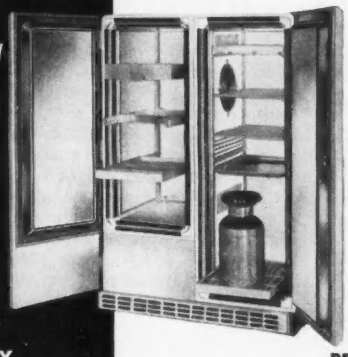
MINUTES

no tools needed



TODAY YOU MAY NEED THIS INTERIOR SET-UP

TOMORROW YOU MAY NEED THIS INTERIOR SET-UP



NO MATTER WHAT YOUR NEEDS YOU HAVE THE RIGHT REFRIGERATOR

OR ANY COMBINATION OF INTERIORS

it's all made possible through **exclusive accessories** *available only with*

VIMCO • STA-KOLD • SNO-QUEEN

ALL-METAL COMMERCIAL REFRIGERATORS

Radically new idea in refrigerators! Revolutionary! Practical! Lightweight, exclusive accessories enable you to have the exact interior you need — when you need it. The change-over is unbelievably simple. Available in sizes up to 90 cubic feet. Enjoy the refrigerator of Today AND Tomorrow!

SEE THEM AT YOUR DEALER'S OR WRITE OR CALL US DIRECT

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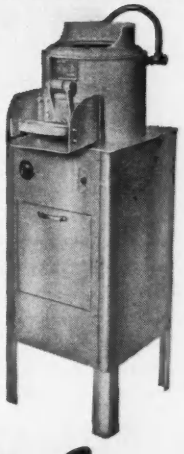
DIRECT FACTORY REPRESENTATIVES IN ALL PRINCIPAL CITIES

Compare the G-W "ROYAL" with any VEGETABLE PEELER

CHECK THESE 8 BASIC FEATURES	G-W "Royal"	Peeler A	Peeler B	Peeler C	Peeler D	Peeler E
Carborundum abrasive on both disc & cylinder	✓	✓			✓	
Carborundum cast-in (Fused in casting process)	✓		✓			
Ten-year warranty on abrasive parts	✓					
Automatic timer	✓					✓
Built-in peel trap	✓			✓		
Combination gear & constant-tension V-belt drive	✓					
1-min. peeling time	✓	✓		✓	✓	
Peeling loss under 10%	✓	✓			✓	

Available in gray enamel or stainless steel.



Price can be deceiving, so don't pay for what you don't get. Be sure you buy the best for your money—buy the G-W "Royal".

For complete information and proof of these 8 G-W features, write

GIFFORD-WOOD CO.
Since 1814 • Hudson, New York

1200

MEALTIME VARIETY For Sodium Restricted Diets

LOW SODIUM CHEESE

A rich-flavored, fine American type cheese adds a tangy treat to salt restricted diets. Sodium content less than milk (9.5 mg. per 100 grams). In ½ lb. and 1 lb. packages.

CELLU WHITE WHEAT BREAD—Flavorsome canned bread made without added salt. Delicious plain or toasted. Sodium content only 0.004%. In 10 oz. tins.

CELLU RICE WAFERS—Toasted wafers made from rice and water without added salt. Tasty with soups and salads. Sodium content 0.018%. In 4 oz. packages.

ALSO AVAILABLE—Cellu Canned Salmon, Tuna Fish, Boned Chicken, Peanut Butter, Canned Vegetables, Salt-Free Soyamaise, and many others.

SEND FOR FREE CATALOGS:

Low Carbohydrate Diet Foods

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Allergy Diet Foods

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Sodium Restricted Diet Foods

PURPOSEFULLY PREPARED
CELLU *Dietary Foods*
CHICAGO DIETETIC SUPPLY HOUSE *Inc.*
1750 West Van Buren Street Chicago 12, Illinois

IBM chooses AUTOMATIC again!

In conjunction with its new World Headquarters cafeteria in New York City, International Business Machines recently purchased an Automatic Food Shaper. This machine is installed in the spotlessly clean kitchen where it is used to prepare hamburgers and other food patties served in the bright, cheery employees' cafeteria. A previously purchased Automatic Food Shaper is in operation at IBM's Endicott, New York plant cafeteria.

By serving delicious, wholesome meals at low cost, this highly progressive company is doing much to promote better employee health and efficiency. By completely eliminating expensive, unsanitary hand shaping, the Automatic Food Shaper helps IBM keep preparation costs at a minimum while serving its employees a nutritious, wholesome meal.

Write for literature that describes our three electrically driven models available with capacities of hundreds or even thousands of patties an hour—all with one operator!

AUTOMATIC FOOD SHAPING CO., INC.
58 New Street New York, New York

Aluminum Cooking Utensil Company, Inc., has just put on the market a new line of seven aluminum roasting and baking pans designed to fit institutional-size ranges and ovens, including both models now in use and new ones offered by the principal range manufacturers. The line includes two types of pans—full-oven and twin-oven size, with the shallow pans designed to serve as covers for the deep pans when required, or as separate roasters. When the shallow pans are used as covers, the unit becomes a steam-seal roaster. All pans have straight sides to utilize the maximum of the oven's space. At least fourteen different combinations of roasting and baking operations are possible with these new pans.

Cereal Institute has announced the availability of a 16 mm., 25-min. health and nutrition education film for children of the elementary grades. Titled, "Bill's Better Breakfast Puppet Show," the film shows an actual puppet show emphasizing the importance of eating breakfast, which was viewed by 125,000 elementary school children and teachers in the New York City public schools. The film is being distributed on a for-sale-only basis. The cost per print is $150, but the Cereal Institute will defray half of the cost, thus reducing the price to educational film libraries and other educational organizations to $75.

Sunkist Growers have released two publications on lemon pies. One, "Sunkist Hows and Whys of Lemon Meringue Pies," answers the most-frequently-asked questions in regard to crust, filling, and meringue. A prize-winning lemon meringue pie recipe and a recipe for lemon meringue tarts are also included. The second release, "Here's How to Freeze Lemon Pie," gives tips on preparing pies for freezing and recipes for: double lemon pie filling, cream lemon cheese pie, magic lemon pie, heavenly fluff, and Tom Thumb lemon tarts. The leaflets are punched for use in a three-hole notebook. They may be obtained free of charge in reasonable quantities.

The *Metropolitan Wire Goods Corporation* has announced the development of a new Plastisol-coated plate holder which holds plates or trays in proper, convenient position for efficient washing in immersion sinks or immersion dish-washing machines. The holder can be placed in any of the company's baskets which have one 14-in. dimension and can also be clipped into a regular tin wire basket to keep the plates from touching the metal and becoming metal-marked. These holders can be purchased individually and placed in existing baskets or can be installed in a new basket at the factory.

The *Southern Cross Manufacturing Corporation* has released a revision of its booklet, "The Processing of Nursing Bottles," which describes a system of work flow and preparation to be used in nurseries. It is illustrated with detailed floor plans and charts and includes photographs of equipment to be used in preparing formula as well as the processing of nursing bottles.